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Opuscula

Annual of the Swedish Institutes at Athens and Rome

17
2024

STOCKHOLM

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Published with the aid of a grant from The Swedish Research Council (2023-00215)
The English text was revised by Rebecca Montague, Hindon, Salisbury, UK. The Italian text was revised by Astrid Capoferro, Rome.

Opuscula is a peer reviewed journal. Contributions to *Opuscula* should be sent to the Secretary of the Editorial Committee before 1 November every year. Contributors are requested to include an abstract summarizing the main points and principal conclusions of their article. For style of references to be adopted, see https://ecsi.se.

ISSN 2000-0898
ISBN 978-91-977799-6-8

Printed by PrintBest (Viljandi, Estonia) via Italgraf Media AB (Stockholm, Sweden) 2024
Cover illustration from Mattia D'Acri & Fredrik Tobin-Dodd in this volume, pp. 105 and 108, figs 10–11 and 17. Photographs by Jonas Tobin.

ÖRJAN WIKANDER

Architectural terracottas from San Giovenale

Addenda and conclusions

Abstract

The publication of most excavation areas at San Giovenale has made it possible to offer a much more detailed and more accurate account of the use of architectural terracottas at the site. This article presents the finds according to categories and types as well as according to their distribution in different excavation areas. It also discusses technical matters and chronological issues. A survey of all decorative terracottas discovered at the site shows that these were not as rare as earlier believed. The conclusion tries to sketch the development of the local terracotta industry.*

Keywords: architectural terracottas, Etruscan architecture, roof-tiles, San Giovenale, urbanization

https://doi.org/10.30549/opathrom-17-07

In 1981, I published a preliminary survey of the typology and technical features of the roof-terracottas discovered at San Giovenale in 1956–1965.[1] It was based mainly on the plain roof-tiles from the Borgo, and my next study (from 2013) was almost entirely so (for a map of the San Giovenale area, see *Fig. 9* below). But there is, in fact, much more to be said about the San Giovenale material. In 1981, my knowledge and comprehension of ancient terracottas were still quite limited and, over the years that have passed, a series of San Giovenale publications have afforded an extensive corpus of new material—partly buried among multitudes of pottery entries but providing some typological and chronological clues. I also retain many old notes not published in my preliminary report. I have gathered all this information and present it here as my final contribution concerning the San Giovenale roof-terracottas.

As my point of departure for the preliminary report was my then-current studies of the enormous amounts of Acquarossa tiles, I found it odd to encounter the small quantities of tile fragments retained among the pottery finds. I was informed by the excavators that a large number of tiles might have been dumped without having been registered. Moreover, "borderless fragments of cover-tiles very often were not recognized as such because of their similarity to some coarse ware and thus were discarded as shapeless coarse ware".[2] This may well be true, but I am now convinced that the immediate discarding played only a marginal role in accounting for the small number of tile fragments. Nor do I believe in my (reluctant) speculation that "a major part of the roof-tiles may have been removed for reuse before the houses collapsed".[3]

In one case, however, deliberate discarding by the excavators can at least be suspected. The Borgo, House A and the West Area yielded *c*. 86% of the tiles, but less than 60% of the pottery (see *Table 1* below, p. 120). One may perhaps suspect that the excavators of Houses B, C and F, Drain L, Well P and

* My thanks are due to Yvonne Backe-Forsberg for pertinent information and for the permission to reproduce *Figs 9* and *19*; to Hampus Olsson for permission to reproduce *Fig. 20*. Julia Habetzeder (editor) and Rebecca Montague (corrector of my English) have scrutinized my text also concerning its factual contents. As usual, Rebecca Bugge has been of great assistance to me concerning both text and illustrations.

[1] For shorter, general introductions to the excavations at San Giovenale, see Hanell 1962 (lucid, but partly out-of-date); *San Giovenale* I:1; Gierow 1986; Nylander 1986; Olsson 2021, 63–68. The final publications of individual excavation areas (*San Giovenale* II–V) are summarized, discussed and commented on in Miller 2017, 31–37.

[2] I. Pohl, in *San Giovenale* V:2, 224. Concerning the southern abutment of the Pietrisco Bridge, we are informed that "[m]any [...] tile fragments [...] were discarded during the fieldwork in 1959–1963" (*San Giovenale* VI:2–3, 277 n. 1072).

[3] Ö. Wikander 1981, 70; Ö. Wikander in *San Giovenale* V:1, 177. Reuse certainly occurred, but presumably only on a limited scale.

Area R were less willing to retain unattractive tile fragments.[4] The well-preserved house walls, standing occasionally to a height of more than two metres, should have protected the fallen roof-tiles from most kinds of disturbances. However, the poor quality of the surviving, collected fragments makes it baffling that these were saved while others were discarded.

Scholars present at the excavation informed me that compact tile layers of the kind known from Acquarossa were never encountered at San Giovenale, and their opinion has been confirmed by data in the publications. Large parts of the Acropolis had been subject to such extensive agrarian activities, including ploughing, that little or nothing was preserved above the Iron Age strata. In the better-protected Area F East, even moderate accumulations of roof-tiles were greeted as "tile falls" and, concerning the Pietrisco Bridge Complex, Yvonne Backe-Forsberg mentions only "an abundance of scattered tile fragments".[5] The San Giovenale excavations never yielded something even remotely similar to the deep and extensive tile layers unearthed at Acquarossa.

1. Typology of plain roof-tiles

PAN-TILES, *TEGULAE* (*FIG. 1*)

Of the many pan-tile fragments recovered at San Giovenale, the great majority are made of reddish-brown clay with the surface covered with (or at least traces of) red slip/paint. Even though only few preserve diagnostic details, we can with confidence assign them to the type almost totally predominant in Archaic South Etruria, Type I. Type II turns up there only slightly before 550 BC, prevailed half a century later, and was—with very few exceptions—made of lighter, better-fired clays.[6] No pan-tile from San Giovenale is complete in length or width.[7] The alleged tile-stamps from the Chapel (LVP[VLLVS EX] P[RAEDIIS]) and Casale Vignale (HILARIA) are almost certainly stamps on bricks, not on roof-tiles.[8]

The typologization of Archaic, Central Italic pan-tiles is based upon the shape of their corners, that is, the methods of creating an efficient overlapping between the tiles.

Type I A

Type I A has lateral raised borders (flanges) continuing straight down to the lower short side. The upper ends of these borders can taper to a point, occasionally right up to the upper short side, but are normally cut off leaving an open space, up to *c*. 8 cm long, for the next, overlapping tile to rest upon. The profile of the border is mostly either roughly triangular or rectangular but can have a more complex shape. A great number of such profiles have been published both by me and by other scholars, but I very much doubt that any useful conclusions can be drawn from them.[9] The overlapping is sometimes made more efficient by cutting off a portion of the underside of the lower corners and, in exceptional cases, a bevel may extend along a part of the lower edges of the long sides.
Area D: Ö. Wikander 1981, 71, 76 nos 3f., 12f., figs 2–5.
Area F East: *San Giovenale* IV:1, 60 nos 7f., 133, figs 55f., pl. 17 (*Pozzo* 1, filled up in the late VI century BC); Winter 2009, 13 (roof 1-8), 24 with n. 69 no. 1.F.1.a, 558; Ö. Wikander 2017, 40 no. 77, 46.
Borgo: Ö. Wikander 1981, 71, 76 nos 1, 16f., figs 2, 4f.; 2017, 40 no. T 77, 46, 49; Ö. Wikander in *San Giovenale* V:1, 177; V:2, 61 no. A:g-3-3, pl. 107.
Pietrisco Bridge: Backe-Forsberg 2005, 52.
Vignale: *San Giovenale* VI:2–3, 131f. no. 75, fig. 115.

[4] I. Pohl even expressed her deep gratitude "to those archaeologists who did discard most of their tile fragments and did not leave boxes full of tiles to break the back of the poor man or woman who had to study and publish their excavations later" (*San Giovenale* V:2, 224 n. 270). In the light of this attitude, it is perhaps easier to understand how a considerable number of complete Etruscan and Roman pan- and cover-tiles could be left without examination or even taking their measurements. Pohl's laconic comments reveal the discard: concerning "Cistern" O2, "All the tile frags., both pan-tiles and of cover-tiles, were scrapped on the spot" (*San Giovenale* V:2, 187), and in "Cistern" O1 "were found about fifty-six frgs. of tiles which were sorted out already at the time of excavation" (*ibid*., 188). For the discarding of tile fragments also speaks the information that pottery body sherds were sometimes thrown away during the excavation.

[5] "Inside Room B of House II, there was what looked like a tile fall to the excavators [...] Also some areas in Court D were filled with roof-tiles, that looked like tile falls, according to Stig Forsberg [...] House I [...] stratum 2B is also filled with large amounts of fallen roof tile and tufa blocks" (*San Giovenale* IV:1, 162, fig. 37)—a destruction probably caused by the earthquake in 550/530 BC. For the Pietrisco Bridge, see Backe-Forsberg 2005, 89, building phase 1, 560–550 BC. Cf. *ibid*., p. 91, fig. 67.

[6] Ö. Wikander 1993, 37f., 159–163; 2017, 140–144.

[7] Cf. Ö. Wikander 1981, 71 with n. 17, concerning an almost complete pan-tile from the Borgo (Room Cb), destroyed before being recorded. See Hanell 1962, fig. 272; Blomé & Nylander 2001, fig. 1; *San Giovenale* V:1, 124, 142, figs 113, 116f., 132. Dated before the earthquake in 550/530 BC.

[8] Berggren 1984, 83, figs 39f.; Hemphill 2000, 46 item 66. F. Tobin-Dodd (Tobin 2015, 77) states explicitly that the Chapel stamps are found on bricks.

[9] Ö. Wikander 1993, 27, 29; 2017, 49. On the relative frequency of triangular and rectangular borders at San Giovenale, see Ö. Wikander in *San Giovenale* V:1, 177.

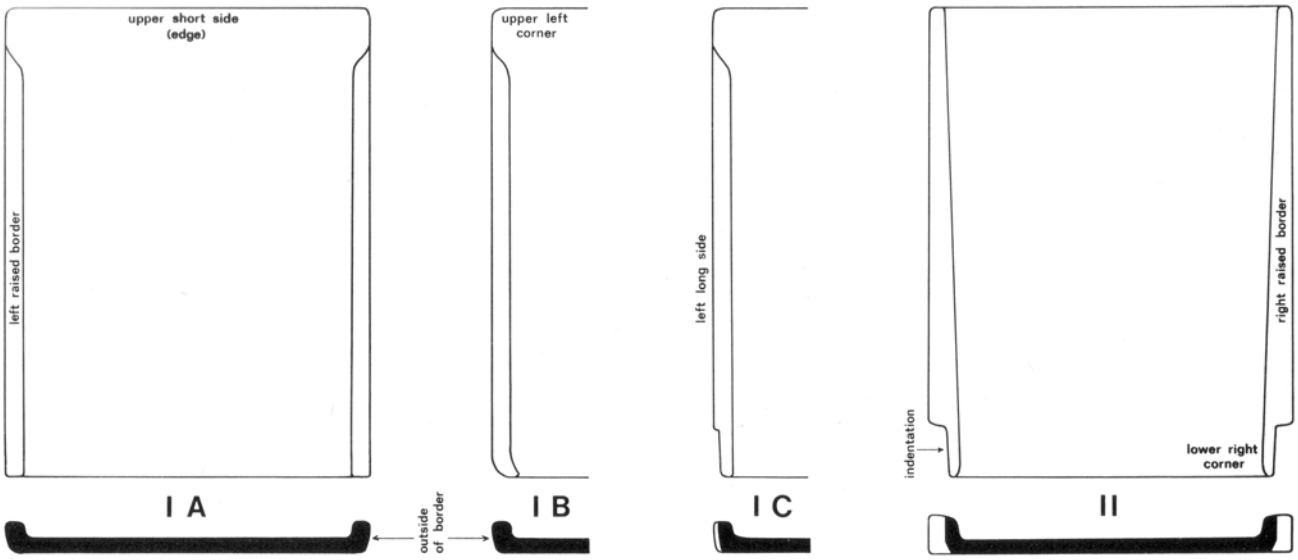

Fig. 1. Typology of Archaic, Central Italic pan-tiles (= Ö. Wikander 1986, fig. 1, above).

Type I B

Type I B is identical with Type I A in all respects but one: the raised borders are rounded inwards at their lower ends, continuing along the short side for a few centimetres. The subtypes are quite distinct, without intermediary forms, and are encountered together at sites from Satricum in the south to Volterra in the north.[10] At San Giovenale, certain examples of Type I B are very rare.

Area F East: *San Giovenale* IV:1, 60 no. 10, 133, fig. 58, pl. 17; Winter 2009, 11 (roof 1-3), 27 no. 1.F.1.b with n. 81, 558.

Borgo: Ö. Wikander 1981, 76 no. 19, figs 2f.; 2017, 40 no. T 77, 46.

Pietrisco Bridge: Backe-Forsberg 2005, 52.

Type I A or I B

The great majority of the Type I pan-tile fragments lack diagnostic details, and their subtypes cannot be determined. Such tiles were found in almost all excavation areas. In the Borgo, their thickness varies from 1.0 to 3.5 cm. The majority fall between 1.5 and 2.2 cm, with an average of 2.0 cm.[11] Twenty-one fragments with reported thickness from other areas vary from 1.5 to 3.0 cm, with an average of 2.1 cm.

The dimensions of the raised borders cannot be determined with certainty, as we only have small fragments to deal with and the size can differ considerably within one and the same border. For the 19 fragments I published in 1981, the width varies from *c.* 2.0 to *c.* 4.5 cm (median value 3.5 cm), the height from 1.8 to 3.7 cm (median value 2.4 cm). Only three measurements are reported from Area F East and two additional widths from the Borgo. The borders from Area F East have an average width of 3.2 cm and height of 2.7 cm.[12] Measuring from the many profile drawings published by Ingrid Pohl[13] gives a median width for the Borgo of *c.* 3.0 cm and a median height of 2.1 cm, but the figures may be distorted somewhat if the reduction scale is not exactly 1:3. At Acquarossa, the median width on more or less complete Type I pan-tiles is *c.* 3.0 cm, the median height 1.8 cm[14]—that is, markedly less than at San Giovenale.

In the list below, some fragments may, in fact, belong to pan-tiles of Type II. But of the areas included, only Area F East, Pietrisco Bridge and Vignale have with certainty yielded such tiles.

Area B: *San Giovenale* II:5, 30f. nos 281–287 (Cistern I), 39 nos 231–236 (Cistern II), 50.

Area D: Ö. Wikander 1981, 71, 76 nos 6, 8, 10f., 22f., figs 3–5.

Area E: *San Giovenale* III:3, 79 no. 57, 81 nos 26–29, fig. 65, pl. 24 (area of Oval Hut II, floors 2 and 1).

[10] Ö. Wikander 2017, 46. Completely unique is a ridge-tile fragment from Area F, House XI, whose short-side raised border is concluded by a similar bend (Ö. Wikander 1981, fig. 11 no. 54). As the ridge-tile borders were fashioned precisely as those on the pans, the variation is no surprise.

[11] Ö. Wikander in *San Giovenale* V:1, 177, fig. 150a.

[12] *San Giovenale* IV:1, 60 nos 7f., 10.

[13] *San Giovenale* V:2, pl. 107.

[14] Ö. Wikander 1993, 29, figs 5f.

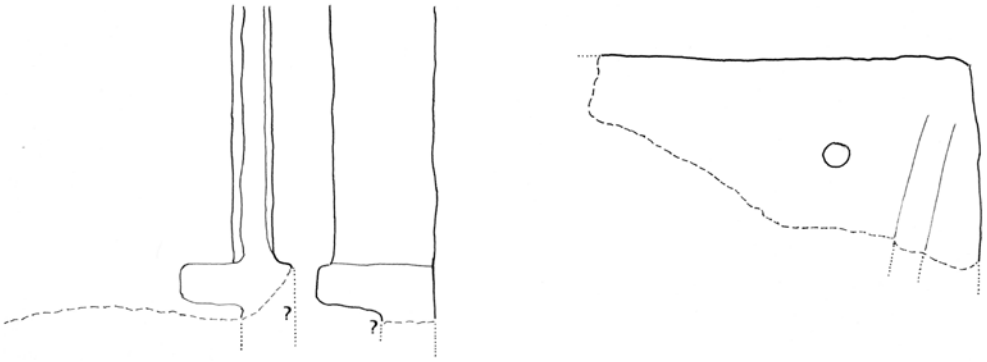

Fig. 2. Eaves-tiles from Area F East: with cover-tile (or pan-tile?) stop and lateral panel (left) and nail-hole (right). Question marks indicate uncertain reconstructions. Drawing based on San Giovenale *IV:1, fig. 57, pl. 18 no. 5.*

Area F East: *San Giovenale* IV:1, 60–64, 75–78, 81f., 84, 99, 103, 105f., 109, 133f., 155, 158, 161–163; Ö. Wikander 2017, 44 no. T 161, 187.
Borgo: Ö. Wikander 1981, 71, 76 nos 2, 5, 7, 9, 14f., 18, fig. 2; 1993, 35 no. T 77, 37; 2017, 40 no. T 77, 46, 49, 187; Ö. Wikander in *San Giovenale* V:1, 177; *San Giovenale* V:2, 30 no. A:b-7-58, 31 no. A:b-3-7-70, 35 nos A:c-7/6-22/26, 60f. nos A:d-2-4-676/706, 64 nos A:i-29/31, 79 no. B:a-2-5, 88 no. B:c-2-3-12, 94 no. C:a-4-4, 103 no. P-1-14, 122 nos R-515f., 137 nos F-135/137, 186f. nos WA-1681/1733, 224, pl. 107.
Pietrisco Bridge: Backe-Forsberg 2005, 52f., 56f., 62 table 4, 85 table 36, 88f., 91f., 141, fig. 94a nos 19–23 (with caption on p. 21); *San Giovenale* VI:2–3, app. 1, 287f. nos 86f., 94–96, 291.
Vignale: Backe-Forsberg 2005, 87 n. 472; *San Giovenale* VI:2–3, 131f. nos 72–74, 76f., figs 115f.

Type II

Type II provides a more efficient coupling between the pan-tiles, by letting the raised border increase gradually in width from the upper to the lower corners, where they are indented to half their width for a length of *c.* 5–19 cm. In South Etruria, the borders are mostly more or less rectangular in section. They are sometimes cut away for a few centimetres to leave an open space for overlapping at the upper end. But no certain examples are known from San Giovenale. The tiles are almost always made of lighter clays, and at San Giovenale such fragments can with confidence be assigned to Type II.[15] Nonetheless, one of the fragments from Area F, House XI (no. 25), dated to *c.* 400 BC, preserves thick dark red paint on the inside of the raised border and a few centimetres along it—a colour characteristic of the early Archaic period and abandoned at Acquarossa in the mid-VI century BC. Pan-tiles of this type are markedly thicker than those of Type I. Fragments from San Giovenale vary from 1.8 to 3.5 cm, with an average of 2.6 cm. This could mean that these tiles were larger than those of Type I,[16] but there is no general connection between thickness and size.
Area C: Unpublished. Documented in 1979.
Area F East: *San Giovenale* IV:1, 62 no. 17, 134, 163, fig. 61, pl. 18 (indented for *c.* 12 cm); Ö. Wikander 2017, 44 no. T 162. An unpublished fragment found in 1963 and documented in 1978 is indented for 9.5–10 cm—from find group S63.78 and, thus, from the *pozzo* in Court D. Cf. *San Giovenale* IV:1, 114, mentioning "tile frgs (some of greenish-grey-white clay) [...]. Nothing later than the 4th century B.C.".
Area F, House XI (cistern): Ö. Wikander 1981, 76 nos 25f., figs 2, 4 (both indented for *c.* 6 cm); 1993, 35 no. T 78, 38; 2017, 40 no. T 78, 46, 49f.
Pietrisco Bridge: *San Giovenale* VI:2–3, app. 1, 288 no. 88.
Vignale: Backe-Forsberg 2005, 87 n. 472 (allegedly Archaic); *San Giovenale* VI:2–3, 131 no. 71, 139, figs 107, 115f.

EAVES-TILES (*FIG. 2*)

Like Acquarossa, San Giovenale apparently lacked the eaves-tiles with painted soffit which became common towards the end of the VI century BC. But two pan-tile fragments presumably derive from the eaves. One upper right corner from *Pozzo* 1 in Area F East has a nail-hole (diam. 0.5–0.8 cm) 3.5 cm from the upper short side, 5.4 cm from the long side.[17] Nail-holes in

[15] Cf. *San Giovenale* IV:1, 134.

[16] As suggested by Warry 2006, 106. But cf. Ö. Wikander 2017, 33 with n. 7.

[17] The diameter of the hole agrees well with those of nail-holes in the San Giovenale revetment plaques (see below, *Section 4, Nos 9–11*): 0.5–0.8 cm on front, decreasing to 0.3–0.5 cm on the back. Many iron nails have been found, probably deriving from the woodwork of the roof, but in such poor condition that I have found only one whose diameter has been reported: *c.* 0.6 cm, from House II, stratum 2A, in Area F East (*San Giovenale* IV:1, 76). For the diameter of pan-tile nail-holes at Acquarossa (slightly larger on average), see Ö. Wikander 1993, 40, fig. 10. At Acquarossa, four iron nails were

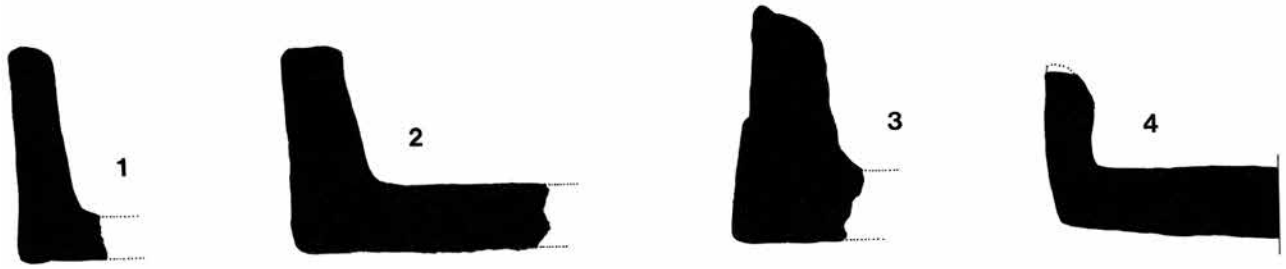

Fig. 3. Pan-tiles with extremely high raised borders. Drawings based on San Giovenale *II:2, pl. 37 no. 32 (1, from Area B), Ö. Wikander 1981, fig. 13 nos 58 (2, from Area F East) and 57 (3, from the Borgo), Backe-Forsberg 2005, fig. 94 no. 24 (4, from the Pietrisco Bridge).*

the upper corners are quite common at Acquarossa, but otherwise not in evidence until the III century BC.[18]

From the same *pozzo* comes a pan-tile with a *c.* 2.5-cm-long knob projecting inwards at right angles from the unusually narrow raised border. As intimated in the publication its purpose was perhaps to function as a tile-stop, in order to prevent the overlapping pan-tile from sliding downwards—probably, but not necessarily, indicating that the tile was resting at the eaves. There is, however, reason to remain sceptical. The broken outwards projection, opposite the knob, has no meaningful purpose if we were dealing with a tile-stop (which would be located at the upper end of the tile). If, on the other hand, the knob was intended to interlock with a notch in the lowermost cover-tile, the projection is presumably the beginning of the *c.* 0.5–1.0-cm-wide lateral panel observed along the lowermost part of eaves-tiles from half a dozen sites in Central Italy.[19]

Nail-hole: *San Giovenale* IV:1, 60 no. 9, 133, fig. 57; Winter 2009, 11 (roof 1-3), 29 no. 1.F.1.c, 558; Ö. Wikander 1993, 40; 2017, 44 no. T 161, 51 item 1.

Tile-stop?: *San Giovenale* IV:1, 59 no. 5, 134, 162, fig. 53, pl. 18 (both upside down); Winter 2009, 29 no. 1.F.1.c, 214 no. 3.F.2; Ö. Wikander 2017, 44 no. 163, 151.

PAN-TILES WITH EXTREMELY HIGH RAISED BORDERS (*FIG. 3*)

Tiles with twice- or even thrice-as-high raised borders as on ordinary pan-tiles have come to light from Artena in the south to Poggio Civitate in the north. They are often published as drain-tiles, placed at ground level, but there is to my knowledge only one group of such tiles discovered used in this way.[20] The great majority have been found in tile falls, and I have long suggested that these are rather the remains of rudimentary, undecorated raking simas—of a type known also in Greece and in the Roman Empire.[21]

At San Giovenale, fragments of at least four such tiles have been found: from Area B (Archaic? H. *c.* 8.7 cm), Area F East (probably Archaic, but later than 550/530 BC; H. 4.9–6.1 cm above tile surface), the Borgo (Archaic; H. *c.* 6.3 cm), the Pietrisco Bridge (Archaic? H. 7.0–7.5 cm?), and perhaps two on the Vignale. The tile plaque is often unusually thick in order to support the heavy raised borders—in the case of the two last-mentioned, *c.* 3.1 and 2.3–2.9 cm, respectively.[22] We only have information on the find circumstances concerning the tile from Area F East: it derives from House III or Court D, stratum 2A, that is, among great numbers of roof-tiles—without a trace of a water conduit.

Area B: *San Giovenale* II:2, 43 no. 32, pl. 37 (Test-Pit H, published as lateral sima); II:5, 40 no. 237.

Area F East: Ö. Wikander 1981, 83 no. 58, figs 12f.; 1993, 43 n. 65; *San Giovenale* IV:1, 103 no. 266, fig. 206 (House III and Court D); Winter 2009, 36 no. 1.F.5, 558.

found still attached to their terracottas: two pan-tiles (Ö. Wikander 1993, 124) and two painted revetment plaques (Ch. Wikander 1988, 66).

[18] Ö. Wikander 1993, 40, 122 n 142, 124; 2017, 51 item 1.

[19] Ö. Wikander 2017, 151. Among the parallels are two eaves-tile types from Caere's port, Pyrgi (Ö. Wikander 1993, 34 nos T 59f.).

[20] Ciaghi 1999, 9f., pls 5:1, 6:1; Winter 2009, 36 no. 1.F.5 with n. 128, table 1.5, ill. 1.5.2; Ö. Wikander 2017, 44 no. T 172, 53f. with n. 76 (Tarquinia). As for the San Giovenale specimens, it should be noted that none was found dug down in the earth, whereas the two cover-tile water conduits in Areas B and F East were still in place when discovered.

[21] Ö. Wikander 1981, 82; 1993, 42f.; 2017, 53f. *Contra*: Winter 2009, 24, 34, 36, 62 n. 37, 72.

[22] This would hardly have been necessary, if we were dealing with drain-tiles, sunk into the ground. At Poggio Civitate, the average thickness of high-bordered tiles is 2.6 cm vs 2.0 cm for ordinary pan-tiles (Ö. Wikander 2017, 33f., fig. 8). At Acquarossa, the difference is lesser: 2.35 cm vs 2.2 cm (Ö. Wikander 1993, 27, fig. 3; the thickness of the high-bordered tiles is taken from the catalogues in Ö. Wikander 1986).

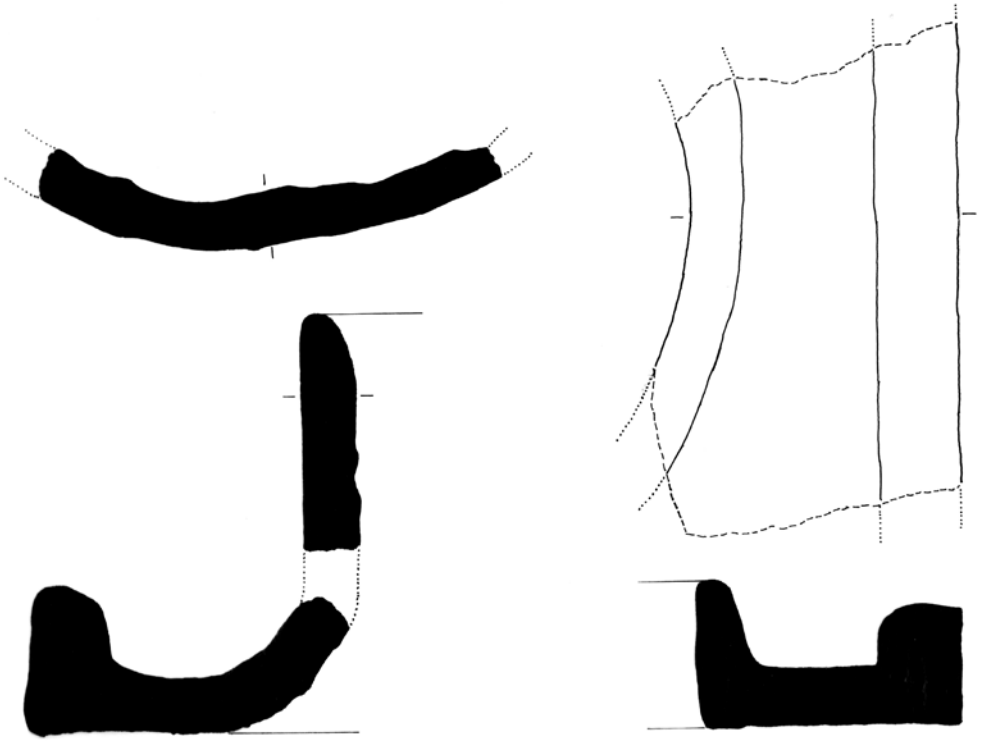

Fig. 4. Skylight-tiles from the Borgo (left) and Area F East (right). Drawings based on San Giovenale *IV:1, pl. 18 no. 6; Ö. Wikander 1981, fig. 13 nos 59f.*

Borgo: Ö. Wikander 1981, 82 no. 57, fig. 13; 1993, 43 n. 65; Barbieri *et al.* 1986, 63 ("*Cantina vino*").
Pietrisco Bridge: Backe-Forsberg 2005, 52, figs 94 no. 24, 96 (used as raking simas in reconstruction of House 1); *San Giovenale* VI:2–3, app. 1, 288 no. 97 (*tegula* 48).
Vignale: *San Giovenale* VI:2–3, 131 no. 93, 190 no. 144, fig. 109 (two possible examples).

SKYLIGHT-TILES (*FIG. 4*)

Pan-tiles with a circular, elliptical or rectangular opening in the centre—intended for airing, lighting and letting out smoke—were used in Central Italy at least from about 575 BC onwards.[23] Two unmistakable examples have been found at San Giovenale: an ordinary fragment from Area F East, presumably of Type I B (= elliptical opening) and some fragments of a curious Type I A (= circular opening) or Type I B tile from the Borgo.[24]

The Borgo tile does not cause any typological problems, but its mode of manufacture is odd and without certain parallels. It was apparently manufactured in a number (hardly fewer than ten) of roughly triangular segments, joined when the clay was already leather-hard. Their innermost parts were bent upwards at an approximately right angle to form a high raised border around the opening, probably rising at least 11 cm above the tile surface.[25] It may, of course, have been lower, if the raised border around the opening was not vertical (as reconstructed in *Fig. 4*) but sloping inwards—a rather unconvincing option, though, as it would reduce the open area and, thus, the efficiency of the tile. Dating the Borgo tile seems impossible. Its secondary firing suggests a pre-earthquake date, while the light clay may favour the V century BC. For some reason, Nancy Winter assigns the Area F East fragment to House III, dated to *c.* 550 BC, even though its excavation from within *Pozzo* 1 clearly indicates its origin from House I. She justifies her attribution with the find of a "lid of a skylight tile" near House III, but this lid presumably belonged to a large vessel (see below in this Section). As it was found in *Pozzo* 1, the fragment should be dated before the earthquake in 550/530 BC, making it one of the earliest examples known.

[23] Ö. Wikander 1983, 94; 1993, 43–45, 172; 2017, 195–200.

[24] NB: These designations refer to the particular skylight-tile typology, not to the types of ordinary pan-tiles. See Ö. Wikander 1983, 91–94.

[25] Judging from the published profile drawing, a skylight-tile fragment from Building H at Satricum (dated to 590/570 BC) may possibly have been produced in the same way (Maaskant-Kleibrink 1992, 54, 158 no. 1325, 265 [drawing]; Ö. Wikander 2017, 196 no. 52). But in that case, the border around the opening is unusually low.

It is, of course, impossible to decide what room in House I was lit by its skylight-tile, but concerning the Borgo fragments, we may at least venture a conjecture. They were found in Area R and, as they can hardly have tumbled down from the *Spina* above,[26] they presumably derive from House C, or more exactly from Room Cb—a small room also distinguished by an indoor well[27] later(?) surrounded by a high *puteal*. The function of the room is uncertain, but these rare structures clearly indicate its particular character. It lies close at hand to consider the preparation of food, even though Etruscan cooking often took place outdoors.[28] Pohl assigned the room to her period 1 (before 575 BC) and suggested that it was destroyed by fire (there was a thin soot layer above the floor)—in perfect accordance with the fact that the skylight-tile shows traces of secondary firing.

Moreover, in the deepest stratum below the Chapel in Area B, a third example of a skylight-tile, "*abbastanza ben conservato*", was found among fallen roof-tiles—whether Etruscan, Roman or originating from the Chapel or its precursor, is impossible to say.

Area B (Chapel): Berggren 1984, 84.

Area F East: Damgaard Andersen 1998, part 1, 113, 117 n. 518; *San Giovenale* IV:1, 59 no. 6, 133f., 162, fig. 54, pl. 18 (*Pozzo* 1, filled up in the late VI century BC); Winter 2009, 12f. (roof 1-8), 31 no. 1.F.3.a, 558; Ö. Wikander 2017, 195 no. 29b. 198, fig. 59.

Borgo: Ö. Wikander 1981, 83 nos 59f., figs 13f., 16a; 1983, 90 no. 29, fig. 8; 2017, 195 no. 29a, fig. 59; Barbieri *et al.* 1986, 60; Ö. Wikander in *San Giovenale* V:1, 178f. (House C?); *San Giovenale* IV:1, 133; V:2, 122 nos R-522f.; Winter 2009, 31 no. 1.F.3.a.

Fragments of a number of apparently circular plaques have been published as skylight-tile lids, but I remain instinctively sceptical. One tile with such a lid (= Type II) was discovered at Acquarossa in 1970, but it is still without parallels,[29] and this method of protecting the opening from rain was obviously extremely rare. The following discs have been published from San Giovenale:

(1) Area B. Est. diam. *c.* 15 cm (*San Giovenale* II:5, 31 no. 292, 50).

(2) Area F East. Est. diam. 56 cm, inner opening diam. 4.4 cm? (*San Giovenale* IV:1, 103 nos 267f., 133f., 162, fig. 207, pl. 19).

(3) Area F East. Two non-joining fragments. Est. diam. *c.* 47 cm (*San Giovenale* IV:1, 103).

(4) Area F East. Est. diam. *c.* 30 cm (*San Giovenale* IV:1, 105).

(5) Borgo. Est. diam. 52 cm (*San Giovenale* V:2, 90 no. B:c-mix-23).

The Acquarossa skylight-tile of Type II has a 32-cm-wide lid, and Central Italic skylight-tiles have openings between 20 and 30 cm wide. Smaller openings would not have fulfilled their purpose, and much larger ones would have demanded more space than allowed for in a pan-tile that was seldom more than 55 cm wide.[30] In other words, Disc (4) is the only one that could seriously be considered. Presumably, they were all lids of big jars or dolia.

COVER-TILES, *IMBRICES* (*FIG. 5*)

During my first studies of the San Giovenale cover-tiles, I was struck by their remarkable scarcity: "Several areas [...] seem to be totally void of cover-tiles [...] Complete profiles occur very rarely; the same is true of fragments of the upper ends [...], without which a typologization is hardly possible."[31] Today, we have the means to put this general impression to the test. The detailed publications of Area F East (*Table 1*) and the Borgo (*Table 2*) provide precise figures concerning finds of both pan-tiles and cover-tiles.

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[26] *Spina* is the term used by the excavators for the plateau south of and above the Borgo NW.

[27] "*Possono i pozzi trovarsi anche* dentro *le case?*" (Nylander 1984, 68). In the final publication, it is intimated—but hardly demonstrated—that the well remained outdoors (that is, south of House B) until the earthquake: *San Giovenale* V:1, 120, 122f., fig. 105, pl. 3. At the Pietrisco Bridge, the well is supposed to have been outdoors, but protected under a shed roof (Backe-Forsberg 2005, 54–56, figs 36, 44a, 96f)—perhaps a kind of kitchen, if Room A was, as suggested, a dining room (cf. *ibid*., 129).

[28] In view of the finds, I. Pohl suggested that the room was used as a kitchen (*San Giovenale* V:2, 93). On the use of skylight-tiles for letting out smoke, see Ö. Wikander 1983, 82, 95, 97–99. Ch. Scheffer (1981, 93–98) argues for outdoor cooking, whereas H. Blanck (1987, 110) is of a different opinion, "*già per motivi climatici*".

[29] Ö. Wikander 1983, 90 n. 30a, 92–95, fig. 9; 1986, 39 no. 26A-B, figs 17f.; 1993, 43f. Such a tile may possibly be mentioned in a literary source. If Aristophanes (*Vespae* 147) does actually refer to a skylight-tile and not to a simple opening in the roof, it was apparently provided with a movable lid (τηλία). See Ö. Wikander 1983, 81f. item a.

[30] Ö. Wikander 1993, fig. 9; 2017, fig. 7 and, particularly, 197 n. 9; Ö. Wikander in *San Giovenale* V:1, 178 with n. 247.

[31] Ö. Wikander 1981, 76.

Table 1. Number of roof-tiles found in Area F East. The figures within parentheses refer to post-Archaic tiles made of lighter clays.

Area F East	**Stratum**	***Tegulae***	***Imbrices***	***Kalypteres***
Pozzo 1		45	14	2
Pozzo 3	3B	(+?)		
House I	1	18 (+14)	9 (+5)	
	2A	11 (+1)	7 (+2)	
	2B	15 (+1)	(+1)	
	3A	26 (+1)	4 (+2)	
House II	1	205	84	
	2A	89 (+1)	95	
	2B	42 (+1)	14	
	3A	4	2	
House III, Room B	1	73 (+2)	65 (+1)	
	2A–B	10	3	
	3A	2		
House III, Room A + Court D	1	294	154 (+2)	1
	2A	309	196	2
	2B	124	72	3
	3A	75	40	
	3B	13	9	
Total		**1,355 (+21)**	**768 (+13)**	**8**

Together with 193 small and unclassifiable fragments from House III, this gives a total sum of 2,358 fragments from Area F East.[32] Excluding ridge-tiles and the late, lighter fragments, 1,355 come from pan-tiles and 768 from cover-tiles, *c*. 64% and 36%, respectively, of the total bulk.

Table 2. Number of roof-tiles found in the Borgo.

Borgo[33]	***Tegulae***	***Imbrices***	***Kalypteres***
House A	45	23	11
Drain L		2	
House B	2	1	2
House C	2	3	
Well P[34]	1	1	
Area R	2	3	2
House F	3		
West Area	53	6	2
Total	**108**	**39**	**17**

[32] Plus an uncertain number of late tiles from *Pozzo* 3. L. Karlsson (*San Giovenale* IV:1, 115), reports a figure of 2,177, but the figures in my table are drawn from his publication: *San Giovenale* IV:1, 60–63, 66, 75–78, 81f., 84, 99, 103, 105f., 109.

[33] Figures drawn from *San Giovenale* V:2, 30f., 35, 60f., 63f. (A), 71 (L), 79, 87f. (B), 94f., 101f. (C), 103 (P), 122 (R), 137 (F), 186f. (WA). Backe-Forsberg in *San Giovenale* V:2, 261, diagram 12, 256 table 93, and my comment in *San Giovenale* V:1, 177 n. 236.

[34] Among a large number of small pieces of tiles.

Together with three pan-tile and one cover-tile fragments published by me but passed over by Pohl,[35] 111 fragments from the Borgo come from pan-tiles and 40 from cover-tiles, *c*. 74% and 26%, respectively.

From the Pietrisco Bridge, Backe-Forsberg reports 630 "stratified profiled" pan-tile and 253 cover-tile fragments *c*. 71% and 29%, respectively.[36]

Based on my studies of Acquarossa tiles, I have suggested that the debris from a regularly laid tile-roof should contain about 60% pan-tile and 40% cover-tile fragments.[37] The San Giovenale figures indicate a slightly higher share of pan-tiles. If these figures are not accidental, they may be caused by reversed pan-tiles being used occasionally to cover the pan-tile joints instead of ordinary cover-tiles (a procedure quite common in modern Central Italy).

My first impression of cover-tile scarcity was obviously exaggerated,[38] but the fact remains that few fragments make a typologization possible. More or less complete cover-tiles were used to cover rock-cut conduits at a well in Area B and at House II in Area F East.[39] But for some reason, these tiles were left *in situ* and never examined. Accordingly, the only certain measurements known concern thickness and in very few cases width and height.[40]

Cover-tile fragments from the Borgo vary in thickness from 0.8 to 2.6 cm (average 1.5 cm). One tile, a well-preserved specimen of Type I, varies from 1.5 to 3.2 cm—an extreme measurement completely without parallels and normally reserved for ridge-tiles.[41] The 14 thickness measurements reported from other areas vary from 0.9 to 2.0 cm (average

[35] Ö. Wikander 1981, nos 9, 16, 19, 35, figs 2f., 6.

[36] Backe-Forsberg 2005, 62 table 4.

[37] Ö. Wikander 2017, 154. A lower share of cover-tiles is a common occurrence. See, for instance, Bengtsson 2001, 101, concerning the territory around Luni sul Mignone in Roman times. For two houses at Acquarossa, apparently almost devoid of cover-tiles, see Ö. Wikander 1993, 127.

[38] As observed as early as 2009 by I. Pohl: "There actually were quite a lot more cover-tiles than hit the eye, both on the Borgo and on the Acropolis" (*San Giovenale* V:2, 224).

[39] Hanell 1962, 308; *San Giovenale* II:5, 11, 15, figs 5–7 (Area B, *c*. 4 m long); Nylander 1984, 66, pl. IV:B; Ö. Wikander 1993, 133; 2017, 67 no. I 76; *San Giovenale* IV:1, 38, 49f., figs 9:B, 18, 37, fold-out pls 1, 3 (Area F East, *c*. 3.2 m long, dated before the earthquake of 550/530 BC?).

[40] When Backe-Forsberg (2005, 52 n. 250) writes that "The length of the cover-tiles is 55–82 cm", she is obviously not referring to specimens from San Giovenale.

[41] Ö. Wikander 1981, fig. 6 no. 27. Cover-tiles are very seldom thicker than 2.3 cm: Ö. Wikander 2017, 85 with n. 151. The 3.2 cm measurement is so odd that I cannot exclude a mistake in my notes.

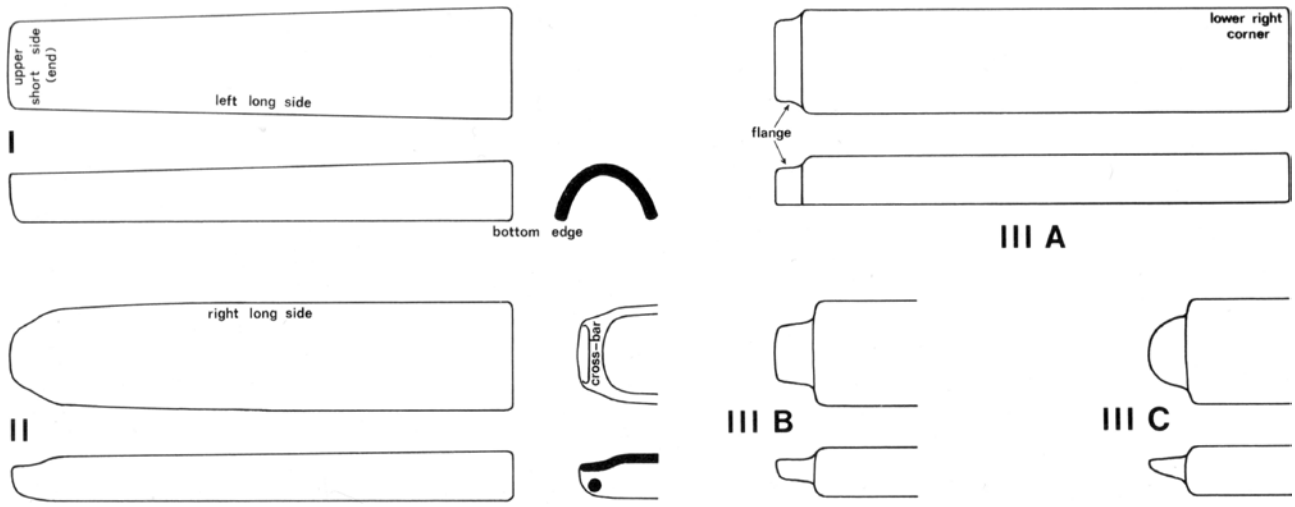

Fig. 5. Typology of Archaic, Central Italic cover-tiles (= Ö. Wikander 1986, fig. 1, below).

1.5 cm).[42] At Acquarossa, the thickness is more or less the same: 0.7–2.2 cm, average 1.4 cm (Type I), 1.3 cm (Type II), and 1.55 cm (Type III). Cover-tiles with complete width and height are too few to allow for any general conclusions.

The typologization of Central Italic cover-tiles is based upon the shape of their upper ends, that is, the methods of creating an efficient overlapping between the tiles.[43]

Type I

Type I cover-tiles are coupled to each other by an even taper in width and height from the lower to the upper end.[44] The presence of this type at San Giovenale is unmistakably proved by one tile only, from the Borgo (Room Bc?), but probable examples derive from other areas, too. The Borgo tile is preserved for (at a guess) two thirds of its length, including its upper end. The width tapers from 15 to *c.* 11 cm, its height from *c.* 7 to *c.* 4 cm. The dimensions of this and other San Giovenale cover-tiles are quite small, in accordance with most Archaic tiles from Acquarossa and Poggio Civitate.[45] Seemingly, this is the only type to survive into the Roman Empire and up to the present day.

Area B: Berggren 1984, 83, fig. 40 (Roman tiles at the Chapel).
Area F East: *San Giovenale* IV:1, 60 no. 11, 162, fig. 59, pl. 17 (*Pozzo* 1, filled up in the late VI century BC), 61, 133 (House I); Winter 2009, 11 (roof 1-3), 38 no. 1.G.1.
Borgo: Ö. Wikander 1981, 76 nos 27f., fig. 6; 1993, 52 no. I 34, 54, 104 n. 34, 108 n. 51, fig. 16; 2017, 65 no. I 34, 187; Ö. Wikander in *San Giovenale* V:1, 178; *San Giovenale* V:2, 31 no. A:b-3-7-72, 87 no. B:c-4-8-15.
Pietrisco Bridge: Backe-Forsberg 2005, 52, 88; *San Giovenale* VI:2–3, app. 1, 284 no. 46?, 291.

Type II

Type II has almost the same width along most of its length, but tapers in width and height at its upper end, without forming a distinct flange.[46] This type is almost totally predominant at Acquarossa, and I once thought that it was a general phenomenon of the area. But in time, I have realized that this is

[42] *San Giovenale* II:5, 31 nos 288–291, 40 nos 238–240, 43 nos 65f.; IV:1, 60 no. 11; VI:2–3, 118 no. 13, 132 no. 78, 148 nos 88f.
[43] Ö. Wikander 1993, fig. 15.
[44] Ö. Wikander 1993, 52 no. I 34, 54, 104 n. 34.
[45] Ö. Wikander 1993, 54 fig. 18; 2017, 68. Apart from the Type I tile just mentioned, I know of only five San Giovenale cover-tiles with complete width and height: one more from the Borgo (Ö. Wikander 1981, fig. 6 no. 38: W. 13.5 cm, H. 6.6 cm), one from Area F East (*San Giovenale* IV:1, 60 no. 11: W. 11.5 cm, H. 6.5 cm), and three from Vignale (*San Giovenale* VI:2–3, 118 no. 13: W. 12–14 cm, H. 7.5 cm; 132 no. 78: W. 11 cm, H. 4.5 cm; 148 no. 88; W. 13.5 cm, H. 5.5 cm). These five fragments are, of course, far too few for meaningful statistical conclusions, but together they imply a height that is 49% of the width—well in accordance with the small cover-tiles from Acquarossa. The small dimensions are confirmed by a number of pan-tiles whose slip and paint are preserved for *c.* 5–8 cm along the long sides (Ö. Wikander 1981, 71, figs 3 nos 10, 12f., 4 nos 17, 25)—protected from the rain by their overlapping cover-tiles. As the lateral interval between the pan-tiles can be estimated at 1–2 cm (Ö. Wikander 1993, 126; 2017, 151), the width of the cover-tiles should have been between 11 and 18 cm, almost the same as at Acquarossa (Ö. Wikander 1993, fig. 18).
[46] Ö. Wikander 1993, 52 no. I 35, 54.

not at all the case, and very few fragments from San Giovenale can be assigned to it.
Borgo: Ö. Wikander 1981, 76, 78 nos 30, 38?, fig. 6; 1993, 52 no. 35, 54, 104 no. I 35, 112 n. 87; 2017, 65 no. I 35; *San Giovenale* V:2, 31 no. A.b-3-7-71, 122 no. R-517.
Pietrisco Bridge: Backe-Forsberg 2005, 52; *San Giovenale* VI:2–3, app. 1, 284 no. 46?, 291.

Type III

Type III has almost the same width along its whole length and a distinct, recessed flange at its upper end.[47] The shape of this flange divides the type into three subtypes, only one of which (the tongue-shaped III C) has been found at San Giovenale: a few fragments from the Borgo. They have an estimated width of *c.* 15 cm and height of *c.* 8 cm. One complete flange has a length of *c.* 8.5 cm, together with Imb 40 from Poggio Civitate, the longest Archaic cover-tile flange known to me. These cover-tiles were found in the yard of House A, strata 2–4, that is, floor 2 (if I have correctly combined data from *San Giovenale* V:1 and V:2), dated before the earthquake in 550/530 BC.[48]
Borgo: Ö. Wikander 1981, 76, 78 nos 29, 31f., figs 6–8; 1993, 52–54 no. I 36, fig. 16; 2017, 65 no. I 36, 187; Ö. Wikander in *San Giovenale* V:1, 178; *San Giovenale* V:2, 61 nos A:d-2-4-708/710, 122 no. R-519 (Type II or III).

Unknown type

The great majority of the cover-tile fragments published from San Giovenale are small and impossible to classify. Seemingly, very few of them can be of any scholarly value, but I nonetheless present a list of the extant material.
Area B: *San Giovenale* II:4, 52 no. 668; II:5, 31 nos 288–291, 40 nos 238–240, 43 nos 63f.
Area F East: *San Giovenale* IV:1, 61–63, 66, 75–78, 81f., 99, 103, 105f., 109.
Borgo: Ö. Wikander 1981, 78 nos 33–37, fig. 6; Ö. Wikander in *San Giovenale* V:1, 178; *San Giovenale* V:2, 61 nos 711–725, 63 no. 31, 64 no. 32, 71 nos 18f., 94 no. 5, 101 no. 8, 102 no. 21, 103 no. 15, 122 no. 518, 187 nos 1734–1739, 224.
Pietrisco Bridge: Backe-Forsberg 2005, 62 table 4, 85, 89; Ö. Wikander 2017, 154 n. 247.
Vignale: *San Giovenale* VI:2–3, 118 no. 13, fig. 115, 132 no. 78, figs 115f. (the authors suggest Type I).

RIDGE-TILES, *KALYPTERES* (*FIG. 6*)

Fragments of ridge-tiles are not particularly rare at San Giovenale. So far, 56 examples have been published: three from Area B, two from Area D, 20 from Area F East, two from Area F, House XI, 20 from the Borgo, five from the Pietrisco Bridge, one from Vignale, and three from the Porzarago Necropolis. They represent four different types,[49] three of which are known from only one building. This is a phenomenon encountered at Acquarossa and Poggio Civitate, too. Both sites have yielded four ridge-tile types, two of which from one single building. In spite of the creation of various types (certainly more than those known to us), one or two were soon considered superior and accordingly became predominant. All but three of the fragments are made of the gritty, reddish-brown clay with red slip/paint, typical of the Archaic period. No complete lengths, widths or heights are preserved. Their wide diffusion proves that most, if not all, buildings at the site were equipped with saddle (double-sloped) roofs.[50]

Ridge-tiles have presented a problem to the illustrators of reconstructed San Giovenale houses. Our deficient knowledge of their shape has forced the artists to find their own solutions. The drawn ridge-tiles (Type I without plastic cordons?) are constantly provided with lateral openings for the cover-tiles (for which there is no evidence at all), whereas it is (naturally) impossible to decide if they are supposed to have had recessed flanges. In Area F East (House I, periods 3 and 4) and at the Pietrisco Bridge (Houses 1 and 2), their length is equal to the width of one pan-tile, in the Borgo (Houses B–D, Carl Nylander's periods 1 and 2) to the width of two. In Area F East, the cover-tile openings are indicated in the centre of the ridge-tile; in the Borgo, there are two openings on each side, near

[47] Ö. Wikander 1993, 52f. no. I 36, fig. 16; 2017, 67f.

[48] The information obtained from the two publications is, indeed, far from easy to combine (cf. Miller 2017, 33f.). But the 41 pottery sherds belonging to the same find groups as the cover-tile fragments (62-190 and 62-191b) confirm the pre-earthquake date—with the possible exception of two sherds of Etrusco-Archaic black-glaze B ware, dated to the end of the VI or the first half of the V century BC. But I. Pohl points out that some of the sherds published under this heading may come from earlier, black-figured vases (*San Giovenale* V:2, 200). I, accordingly, change my proposed date of these cover-tiles from 650/475 (Ö. Wikander 1993, 52) to 625/530 BC.

[49] In Ö. Wikander 1981, 78–82, and in Ö. Wikander in *San Giovenale* V:1, 178f., I cautiously denoted them "groups", but some writers have called them "types", and today I see no reason not to do so myself.

[50] P.M. Miller (2017, 172) thinks that ridge-tiles do not necessarily prove the presence of saddle roofs but does not substantiate his claim. Parts of three San Giovenale buildings have been reconstructed with shed (single-sloped) roofs: House II in Area F East (*San Giovenale* IV:1, fig. 295b, one of three propositions), the "Work area" Ac in the Borgo (*San Giovenale* V:1, pl. 3), and the porch of Houses 1–2 at the Pietrisco Bridge (Backe-Forsberg 2005, figs 96f). The appearance of the roof of the apsidal House 3B there cannot be ascertained (p. 141).

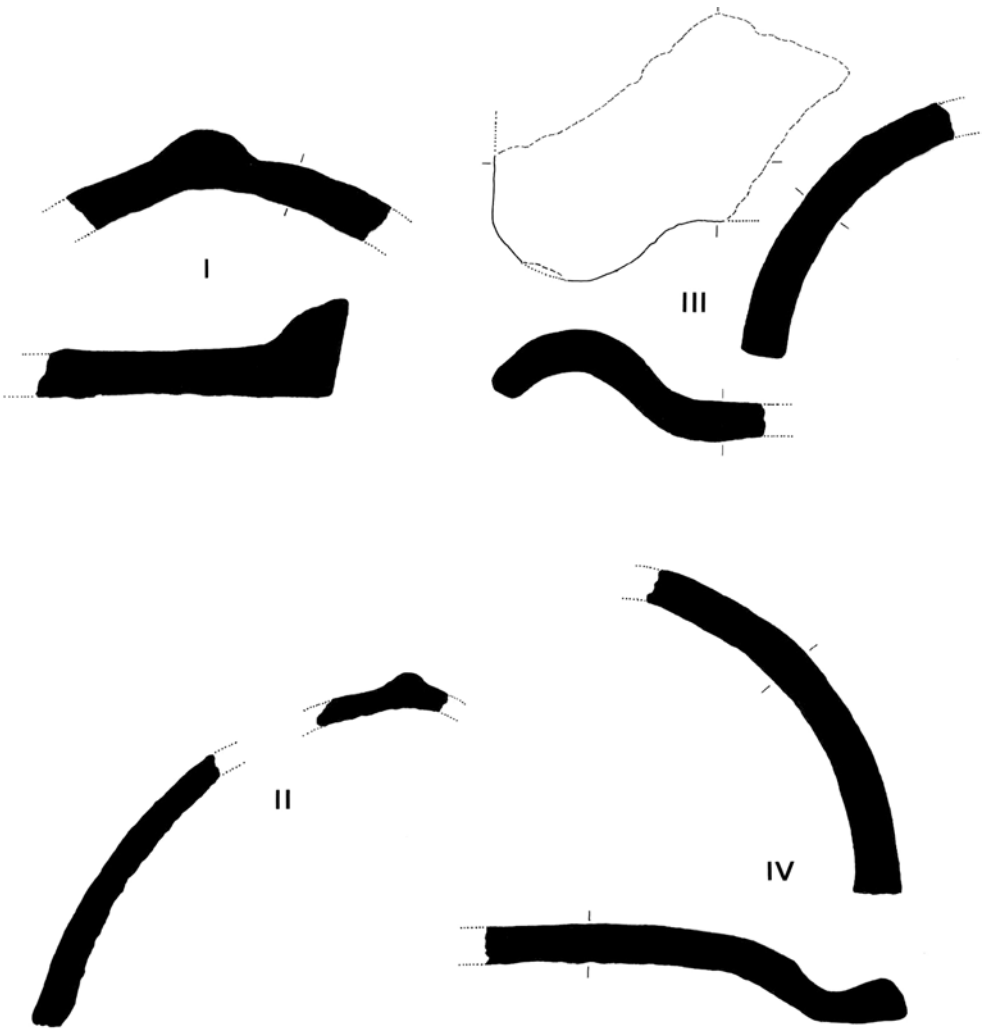

Fig. 6. The four ridge-tile types found at San Giovenale. All fragments come from the Borgo. Drawings based on San Giovenale *V:2, fig. 108 nos A:d-2-4-728 (Type I) and A:d-2-4-735 (Type IV), Ö. Wikander 1981, fig. 9 nos 47f. (Type II) and fig. 11 no. 49 (Type III).*

its ends. Both solutions are at least theoretically possible—in contrast to the one presented for the Pietrisco Bridge, where the openings are placed differently on each tile.[51]

There is no general typology of Central Italic ridge-tiles;[52] the finds are classified separately for each individual site. The San Giovenale types have parallels elsewhere, but the fragments are too small to let us determine how far-reaching the similarities are. No ridge-tile fragment preserved traces of a lost akroterion.

Type I

Type I has a horizontal cordon (p. 134) along its top and a transversal raised border along at least one short side—similar to those of pan-tiles of Type I, but mostly triangular in section, *c.* 1.5–*c.* 3.5 cm wide (average 3.0 cm) and rising 1.1–2.6 cm above the tile surface (average 1.85 cm). Similar cordoned ridge-tiles are known from both Acquarossa and Poggio Civitate,[53] and it is tempting to reconstruct the San Giovenale specimens in accordance with them. If so, they should have been almost one metre long and lacked lateral openings for the insertion of the cover-tiles. Whether they had a flange to couple them with each other remains uncertain: the Acquarossa examples have, those from Poggio Civitate have not. In any case, no such flanges have been discovered at San Giove-

[51] *San Giovenale* IV:1, figs 293, 296 (Area F East); Blomé 2001, figs 2f.; *San Giovenale* V:1, pl. 3 = VI:2–3, fig. 71 above (Borgo); Backe-Forsberg 2005, figs 96f. = *San Giovenale* VI:2–3, figs 13, 39f. (Pietrisco Bridge). The same problems affect the reconstructed roofs in *San Giovenale* VI:2–3, figs 89, 221.

[52] For an interim "typology", see Ö. Wikander 2017, 70. According to that, the San Giovenale ridge-tiles would be denoted as follows: Type I: A?A?–, Type II:– – –, Type III: D– –, Type IV: C– – .

[53] Ö. Wikander 1993, 61f. (Acquarossa, Type II B/C); 2017, 78f. (Poggio Civitate, Type II).

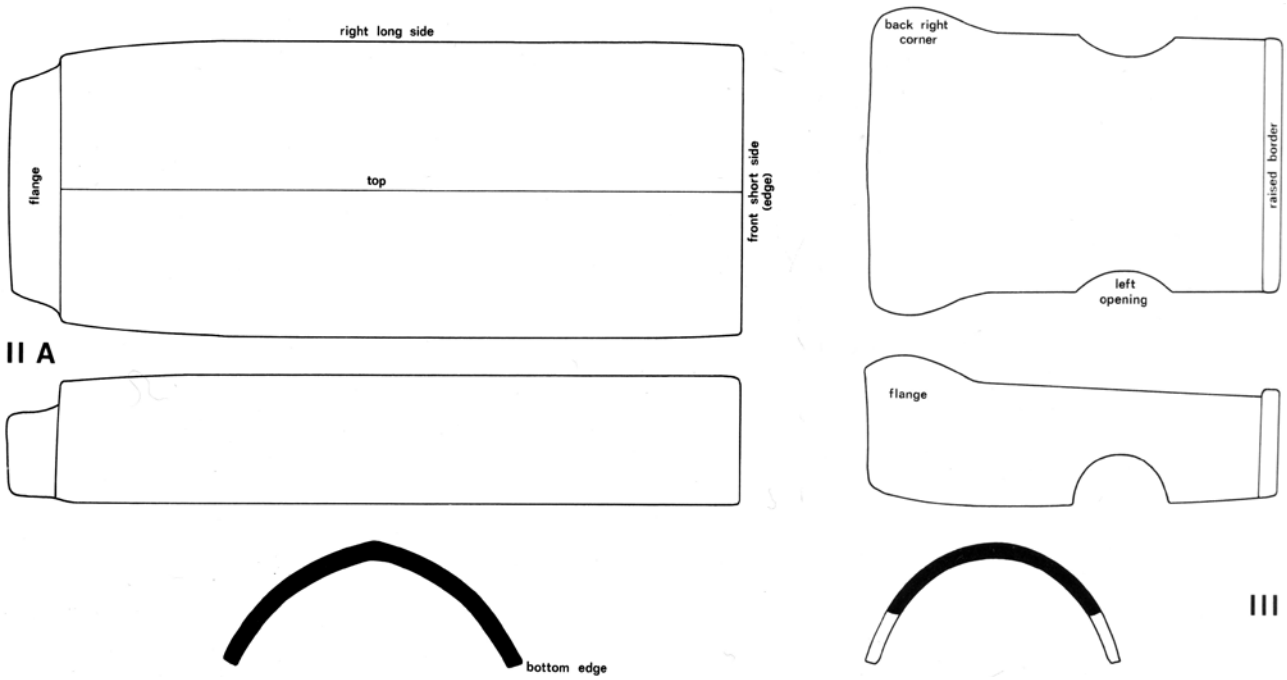

Fig. 7. Typology of ridge-tiles from Acquarossa (= parts of Ö. Wikander 1986, fig. 2).

nale. I once suggested an overlapping flange—a logical, but little-convincing proposal.

A particular problem is constituted by a Borgo fragment I published in 1981 as no. 56 (from the yard of House A). As it obviously has no horizontal cordon, I assigned it with some hesitation to Type III, but its great size makes this identification almost impossible. We may have to do, instead, with a Type I ridge-tile *without* cordon—there are some parallels to this at Acquarossa (there called Type II A, *Fig. 7*). In theory, the fragment that I publish as Type IV (also coming from the yard of House A) could, in fact, be the flange of a Type I ridge-tile without cordon, but I doubt it.

More than half of the ridge-tile finds belong to this type, and they derive from most excavation areas. The thickness varies from 1.5 to 2.8 cm (average 2.0 cm). The clay is mostly reddish brown with a grey to black core. The surface is covered with (or at least shows traces of) red, often dark red paint.
Area B: *San Giovenale* II:2, 43 no. 33 (with cordon, but published as "imbrex"); II:5, 40, 50 no. 241 (Cistern II).
Area C: Unpublished. Documented in 1979.
Area D: Ö. Wikander 1981, 79 nos 39, 44, figs 9f.
Area F East: *San Giovenale* IV:1, 59, 162 no. 4, fig. 52, pl. 17 (*Pozzo* 1, filled up in the late VI century BC), 99, 103 no. 269, 105, fig. 208 (House III), 133f.; Winter 2009, 11 (roof 1-3), 44 no. 1.H.1.b with n. 160 (House III), 558; Ö. Wikander 2017, 82 no. K 28, 88, 186, fig. 33.
Area F, House XI: Ö. Wikander 1981, 81 nos 43, 54?, figs 9, 11.
Borgo: Ö. Wikander 1981, 79 nos 40–42, 45, 81 no. 56, figs 9–11; 1993, 67 no. K 28, 71, 140, fig. 24; 2017, 82 no. K 28, 88, fig. 33; Ö. Wikander in *San Giovenale* V:1, 178–180; *San Giovenale* V:2, 30 no. A:b-7-57, 61 nos A:d-2-4-726/728, -729?, -734?, 71 no. L-20, 122 nos R-520, -521?, 187 nos WA-1740f., 224, pl. 108.
Pietrisco Bridge: Backe-Forsberg 2005, 52f., 62 table 4, 88, fig. 94a, with caption on p. 21 no. 26 (Houses 1 and 2); *San Giovenale* VI:2–3, app. 1, 287f. nos 81, 98, 291.

Type II

Type II is perhaps only a subgroup of Type I. It comprises a dozen closely related fragments, all from Area F East.[54] They are very badly worn, but three of them show a low and poorly-accentuated horizontal cordon along the top (distance between notches *c*. 2.8 cm). No short side is preserved. The walls are strikingly thin (0.9–1.6 cm), even considering the fact that most of the surface layer is lost. But ridge-tiles as thin as these were in use at both Acquarossa and Poggio

[54] In 1981 (79 n. 29), I erroneously assigned these fragments to a house at the Pietrisco Bridge. But their find group (S63.45) unmistakably proves that they come from Area F East, House III, Room A & Court D, stratum 2b. The three cordoned fragments are mentioned by L. Karlsson in *San Giovenale* IV:1.

Civitate, even though there, too, the more common types were much thicker.[55]
Area F East: Ö. Wikander 1981, 79, 81f., nos 47f., fig. 9; 1993, 67 no. K 29, 72, 140, 152 n. 57, 160; 2017, 88; *San Giovenale* IV:1, 105 (House III).

Type III

Type III is represented by five examples found close to each other in the Borgo and probably deriving from the roof of House A. They have a torus-shaped, overlapping flange, similar to Acquarossa Type III (*Fig. 7*, right),[56] but they are much smaller and more strongly curved. It seems reasonable to assume that they had the lateral openings for cover-tiles of the Acquarossa specimens, and the flanges make it plausible that the other short side was equipped with a raised border in order to prevent rainwater from entering the joints. The raised borders preserved from the Borgo are, however, of too large dimensions and must be assigned to Type I. The clay is of the usual San Giovenale quality, except for no. 51, whose fabric is rather beige with great amounts of white specks. The upper surface is only moderately worn, while the underside of some fragments is somewhat smoothed. The thickness varies from 1.4 to 2.3 cm, with an average of 1.8 cm.
Borgo: Ö. Wikander 1981, 81 nos 49–53, figs 10f.; 1993, 67 no. K 30, 69, fig. 24; 2017, 82 no. K 30, fig. 33; Ö. Wikander in *San Giovenale* V:1, 179; *San Giovenale* V:2, 61 nos A:d-2-4-730/733, 71 no. L-1-21, 224.

Type IV

Type IV, identified by Pohl, is represented by a sole fragment from the yard of House A in the Borgo. It has no horizontal cordon but a recessed, carelessly shaped flange without a distinct limitation between itself and the main part of the tile. The thickness is 1.8–2.1 cm; the clay is brown with a grey core, and a greyish-buff surface. The stratigraphies of Nylander (*San Giovenale* V:1) and Pohl (*San Giovenale* V:2) differ completely, but Pohl apparently assigned her stratum A:d-2-4 to the period after the earthquake of 550/530 BC.
Borgo: *San Giovenale* V:2, 61 no. A:d-2-4-735, 224, pl. 108; Ö. Wikander 2017, 84 no. K 66, fig. 33; Ö. Wikander in *San Giovenale* V:1, 179.

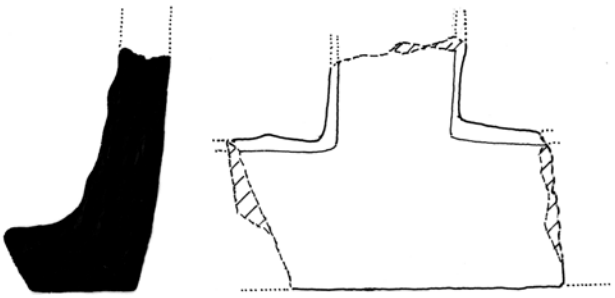

Fig. 8. Ridge-tile end-plaque with two triangular holes? Drawing based on San Giovenale *II:4, pl. 28 no. 612.*

RIDGE-TILE END-PLAQUES

The openings of the ridge-tiles at the gables involved problems similar to (but more serious than) those of the cover-tiles at the eaves. Rainwater could intrude and damage the woodwork of the roof. But in the same way that the cover-tile openings could be protected by antefixes, those of the ridge-tiles could be closed by circular or semicircular end-plaques, although such are rare. None has been discovered at Poggio Civitate, but Acquarossa yielded fragments of two different types, one disc-shaped(?) and one semicircular with one or two triangular holes reminiscent of antefixes of Types II and III.[57]

House I in Area F East (period 3) has been reconstructed with disc-shaped end-plaques at the gables, but there is no factual ground for this.[58] On the other hand, a terracotta fragment from the subterranean building in Area B, obviously intrusive and found immediately below mediaeval strata, may well be the central part of an end-plaque with two triangular holes (*Fig. 8*). No measurements are given, but, according to the drawing, they can be estimated as approximately pres. W. 10.8 cm, pres. H. 8.0 cm. The reddish-brown clay and red paint on the front are typical for the San Giovenale roof-tiles, but the existence of a rear "ledge" made Pohl hesitate as to the identification. Nothing like it is to be found on the Acquarossa specimens. I share her doubts, but the fact remains that it is difficult to say what else the fragment might be.
Area B: San Giovenale II:4, 49 no. 612, fig. 29, pl. 28; Ö. Wikander 2017, 88 n. 173.

2. Distribution (*Fig. 9*)

Almost every trench on the Acropolis has yielded fragments of Archaic Etruscan roof-tiles, and it seems a reasonable as-

[55] Ö. Wikander 1993, 60, fig. 20b (Acquarossa, Type I); 2017, 78, 81, fig. 31 (Poggio Civitate, Types I and IV).
[56] Ö. Wikander 1993, 62–64.
[57] Ö. Wikander 1993, 65; 2017, 88f.; Winter 2009, 134.
[58] *San Giovenale* IV:1, figs 292f.; Ö. Wikander 2017, 88 n. 175, 155 n. 260.

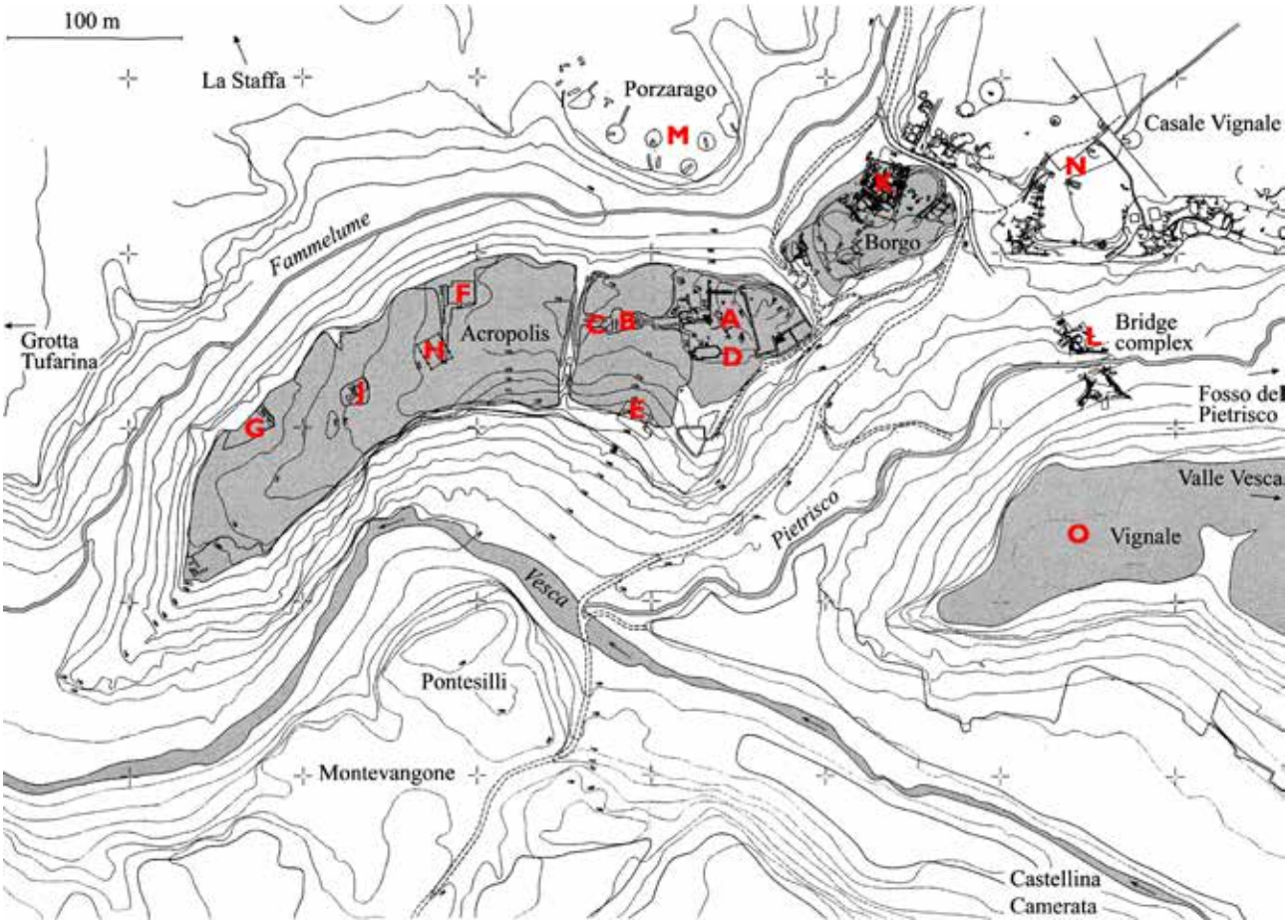

Fig. 9. Plan of San Giovenale with surroundings. Red letters indicate find locations presented in Section 2 *(= Backe-Forsberg 2005, fig. 2, with additions). Ultimately based on a drawing by S. and A. Tilia.*

sumption that the entire plateau was once covered with tile-roofed buildings. The fact that even the unsuitable Borgo slope was densely built up before 600 BC clearly indicates that the Acropolis plateau was already at this time full of houses. The urbanization process must—as at Acquarossa—have been swift and of short duration. Concentrations of Archaic tiles have also been reported from various sites in the surroundings of San Giovenale;[59] the list below however includes only localities on the Acropolis and its immediate neighbourhood. References to pages and figures concern the works mentioned in parentheses after the headings. It should be noted that, whereas letters denoting areas have remained the same from an early stage, the original house numbers have in most cases been changed.[60]

The frequent use of roof-tiles for other purposes than roof construction[61] had left only few examples at San Giovenale. For tomb-tiles, see below, items d and m; for water conduits, items c and h.[62] In a well in Area B were found three 46-cm-long tubular tiles intended for a water conduit or drain.[63] At a number of Etruscan sites, tile fragments were inserted into joints between tufa blocks in house walls, but I have found

[59] See, for instance, Hemphill 2000, 39 no. 40, 77 no. 114, 85 no. 132, 87 no. 137 (= Ö. Wikander 2017, 42 no. T 120). Archaic tiles have also been found at the even more isolated Luni sul Mignone: Bengtsson 2001, 91 n. 50 (on Monte Santo, a good kilometre south-east of the Acropolis).

[60] For the precise location of excavation areas and trenches on the Acropolis, see *San Giovenale* II:2, plan A. For a series of informative airial views, see *San Giovenale* VI:2–3, figs 3, 7, 9, 20, 26, 30f., 45, 68, 170, 212, 224.

[61] Ö. Wikander 1993, 132f.; 2017, 164f.

[62] For a possible, similar cover-tile water conduit on Vignale, see *San Giovenale* VI:2–3, 147.

[63] *San Giovenale* II:5, 15, 43 nos 67f., fig. 8.

no evidence of such use at San Giovenale.[64] At the Pietrisco Bridge, roof-tile fragments from the earthquake were used, together with the river pebbles and *tufetti* to pave the road and the triangular "*piazza*" at the south abutment. A larger fragment sealed a flat bronze object, interpreted as a foundation offering.[65] But, apart from the Pietrisco Bridge, road and "*piazza*", broken roof-tiles were seldom used to stabilize floors and pavements. In the Borgo, tile fragments are mentioned often in fills, but never in floors. In Area F East, they were observed, together with *tufetti* and small stones, in the *battuto* which constituted the second Archaic floor level in all three houses (period 4).[66] But if these tiles were the remnants of tile falls from the earthquake of 550/530 BC or were put there on purpose is impossible to say.

(A) AREA B, TEST TRENCHES 1957–1960, HOUSE III (*SAN GIOVENALE* II:2)

The excavations comprised a great number of test-pits and trial trenches west of the Castle, only one of which was expanded to a larger area: Building I in Test-Pit L, which was totally devoid of roof-tiles. The other finds extend from Late Bronze Age Sub-Apennine impasto at least to the VI century BC, including the foundation of an Archaic building (House III). Roof-tiles were found in upper strata.

Archaic tiles

Pan-tiles and cover-tiles: pp. 18 (Test-Pits MNO), 21 (Test-Pit K), 22 (Test-Pits HJ), 43 nos 35–37? (Test-Pit B), pl. 37.
Pan-tile painted white-on-red (see below, *Section 4*, *No. 1*): p. 43 no. 34, pl. 37 (Test-Pit K).
Pan-tile with extremely high raised border: p. 43 no. 32, pl. 37 (Test-Pit H).
Ridge-tile Type I: p. 43 no. 33 (Test-Pit H).

Mediaeval tiles

Roof-tiles: pp. 18 (Test-Pits MNO), 21 (Test-Pit K), 22 (Test-Pit H).

(B) AREA B, SEMI-SUBTERRANEAN BUILDING, EARLIER "HOUSE O" OR "HOUSE IV" (*SAN GIOVENALE* II:4)

A square cutting in tufa bedrock was excavated in 1959–1961; for its precise location, see *San Giovenale* II:4, fig. 1. The finds date mainly from *c*. 730–680 BC, and only a few, intrusive, roof-terracottas were found immediately below mediaeval strata, "belonging to most of the periods of settlement represented on the acropolis".
Archaic cover-tile: p. 52 no. 668.
Archaic ridge-tile end-plaque?: p. 49 no. 612, fig. 29, pl. 28.

(C) AREA B, TWO CISTERNS AND A WELL (*SAN GIOVENALE* II:5)

The excavations in 1958–1961 concerned three water installations in the vicinity of the Semi-Subterranean Building; for their precise location see *San Giovenale* II:4, fig. 1. The cisterns are Archaic, whereas the well is dated to the IV–III centuries BC. The finds extend from the VI to the III century BC.

Archaic tiles

Pan-tiles: pp. 30f. nos 281–287 (Cistern I), 39 nos 231–236 (Cistern II), 50.
Pan-tile with extremely high raised border: p. 40 no. 237 (Cistern II).
Alleged skylight-tile lid: pp. 31 no. 292, 50 (Cistern I).
Cover-tiles: pp. 31 nos 288–291 (Cistern I), 40 nos 238–240 (Cistern II), 50.
Ridge-tile: pp. 40, 50 no. 241 (Cistern II).

Later tiles with lighter clay

Pan-tiles: pp. 40 nos 242f. (Cistern II), 43 nos 60–64 (Well), 50, pl. 23.
Cover-tiles: pp. 11, 15, fig. 5 (water conduit to the Well), 43 nos 65f. (Well), 50.
Ridge-tile: p. 40 no. 244 (Cistern II).

(D) AREA B, THE CHAPEL

Close to the northern wall of the XIII-century Chapel, west of the Castle, were found five Roman *tombe a fossa* covered with pan-tiles and (Type I?) cover-tiles. The tombs as such are of little assistance for dating, even though their shape may suggest a date between the IV and II century BC.[67] Roman tiles were also found below the western part of the Chapel.

[64] The need must have been less due to the frequent use of lime-free mortar (*San Giovenale* V:1, 174). When it did arise, the builders used river pebbles (*San Giovenale* V:1, 161). Tile fragments may possibly have been used at the Pietrisco Bridge (Backe-Forsberg 2005, figs 38, 66), but the definition of the photographs does not allow firm conclusions to be drawn.

[65] Backe-Forsberg 2005, 51, 56, 91, 169 (road), 170 ("*piazza*").

[66] *San Giovenale* IV:1, 45, 49, 51.

[67] Tobin 2015, 77, referring to I. Pohl (1985, 62) who does not say so explicitly. E. Berggren (1984, 83) presents parallels to the tombs from the IV century BC to the II century AD. P.G. Gierow (1986, 28 with

Pan-tiles: Welin 1962, 282; Berggren 1984, 83f., figs 39f.; D. Whitehouse, in Forsberg & Thomasson 1984, 108; Tobin 2015, 77, fig. 54 (seemingly including a pan-tile of Type II); *San Giovenale* VI:2–3, 215, 268.
Skylight-tile: Berggren 1984, 84.
Cover-tiles: Berggren 1984, 83, fig. 40; Tobin 2015, 77, fig. 54; *San Giovenale* VI:2–3, 215.

(E) AREA C, HOUSE V, EARLIER "HOUSE K"

In the southernmost part of this area, at the very edge of the plateau, terracing works and a VII- or VI-century BC building were unearthed in 1961–1963, with "a remarkable number of roof tile fragments".[68] A plan of the building is to be found in Hanell 1962, fig. 275, and *San Giovenale* VI:2–3, fig. 73.
Pan-tile Type II: Unpublished. Documented in 1979.
Ridge-tile Type I?: Unpublished. Documented in 1979.
Revetment plaque? (see below *Section 4*, *No. 11*, *Fig. 17*): Ö. Wikander 1981, 86 no. 62, fig. 13 (found immediately west of the long north–south wall).

(F) AREA D WEST, EARLIER "HUTS M" OR "HUTS VI" (Ö. WIKANDER 1981)

This area, excavated in 1957–1961, is best known for its well-preserved oval Iron Age huts, but close to the surface a considerable number of tufa blocks, roof-tiles and pottery were found from one or more completely destroyed Archaic houses, dated to the VII–V centuries BC.[69]
Archaic pan-tiles: pp. 71, 76, figs 2–5.
Archaic ridge-tiles: p. 79, figs 9f.

(G) AREA E, IRON AGE HABITATIONS, EARLIER "HUTS P" OR "HUTS VII" (*SAN GIOVENALE* III:3)

In 1960, "the abundance of archaic roof-tiles on the ground" led to the discovery of oval Iron Age huts, whereas very little remained of the Etruscan houses. The excavation yielded little Archaic (mostly VII-century BC) pottery and only a few tile fragments at Oval Hut II, floors 1 and 2, probably "parts of houses or courtyards of a house from the seventh or early sixth centuries BC".[70] Finds from the surface layer and stratum 1 are not included in the publication.
Archaic pan-tiles: pp. 79 no. 57, 81 nos 26–29, fig. 65, pl. 24.

(H) AREA F EAST, EARLIER "HOUSE W" OR "HOUSES VIII–X" (*SAN GIOVENALE* IV:1)

Three Archaic houses (now, and during the excavation, called Houses I–III), two courtyards and four wells yielded finds from *c*. 675 to *c*. 275 BC. The detailed publication of the roof-terracottas makes important conclusions possible. Winter tentatively combined Type I B pan-tiles, the eaves-tile with nail-hole, Type I cover-tiles, and Type I ridge-tiles (all from *Pozzo* 1) to her roof 1-3, dated *c*. 625 BC and destroyed in the earthquake less than a century later.[71] Considering the position of *Pozzo* 1, immediately outside the south-western corner of House I, it seems sensible to connect the roof (including the skylight-tile) with that building. The roof of House III might have consisted of Type I pan-tiles, pan-tiles with extremely high raised borders, Type I and II ridge-tiles, and the odd relief frieze plaque, but the uncertainties are greater in that case. There is evidence of light roof-tiles from the later reconstruction of House I, whereas Houses II and III yielded only a few greenish pan-tile fragments (one of them described as "possibly intrusive").

Archaic terracottas

Pan-tiles Type I A: p. 60 nos 7f., figs 55f., pl. 17 (*Pozzo* 1).
Pan-tiles Type I B: p. 60 no. 10, fig. 58 (*Pozzo* 1).
Pan-tiles Type I A or I B: pp. 75–78, 158 (House II), 81f., 84, 99, 103, 105f., 109, 161 (House III).
Painted pan-tile (see below, *Section 4*, *No. 2*, *Fig. 10*): pp. 60 no. 7, 162, fig. 55, pl. 17 (*Pozzo* 1).
Eaves-tiles (*Pozzo* 1): pp. 59 no. 5, fig. 53, pl. 18 (tile-stop), 60 no. 9, fig. 57 (nail-hole).
Pan-tile with extremely high raised border: p. 103 no. 266, fig. 206 (House III).
Skylight-tile: pp. 59 no. 6, 162, fig. 54, pl. 18 (*Pozzo* 1).
Alleged skylight-tile lids: pp. 103 nos 267f., 105, fig. 207, pl. 19 (House III).
Cover-tiles Type I?: p. 60 no. 11, fig. 59, pl. 17 (*Pozzo* 1).
Cover-tiles: pp. 38, 50, figs 9:B, 18, 37 (water conduit in House II), pp. 75–78, 158 (House II), 81f., 99, 103, 105, 107, 109 (House III).
Ridge-tiles Type I: pp. 59 no. 4, fig. 52, pl. 17 (*Pozzo* 1), 99, 103 no. 269, 105 (House III).
Ridge-tiles Type II: p. 105 (House III).
Relief frieze plaque? (*Section 4*, *No. 10*, *Fig. 16*): pp. 81 no. 95, 133, 162, fig. 110, pl. 19 (House III).

Later tiles with lighter clay

Roof-tiles: pp. 73, 155 (*Pozzo* 3).
Pan-tile Type II: pp. 62 no. 17, 163 (House I).

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n. 22) suggests the III or II century BC. Cf. *San Giovenale* VI:2–3, 44, 215f., figs 15, 191 (suggesting V or VI century AD on p. 268).

[68] Hanell 1962, 304. "The whole Etruscan complex has been dated to 625–530 B.C." (Backe-Forsberg 2005, 151 n. 986).

[69] Malcus 1984, 37.

[70] *San Giovenale* III:3, 95.

[71] Winter 2009, 11, 558.

Pan-tiles: pp. 61–63, 66, 155, 163 (House I), 76f. (House II), 81 (House III).
Cover-tiles Type I?: pp. 61–63, 66, 155, 163 (House I),
Cover-tiles: pp. 81, 99 (House III).

(J) AREA F, HOUSE XI, EARLIER "HOUSE R" (Ö.WIKANDER 1981)

A house with two apparently detached rooms was erected *ex novo c.* 400 BC or slightly earlier above a quarry for tufa blocks. The walls are badly damaged, but a number of roof-tiles were found together with pottery dated to the IV and III centuries BC.[72] A plan of the house is to be found in Pohl 1985, fig. 3.
Pan-tiles Type II: p. 76 nos 25f., figs 2, 4.
Ridge-tiles Type I: p. 81 nos 43, 54?, figs 9, 11.

(K) BORGO NW, EARLIER "HOUSE N" OR "HOUSE I"

A well-preserved area in the eastern slope of the Acropolis, excavated in 1956–1957, 1961–1963 and 1965. A number of houses, courtyards etc. yielded extensive finds from the late VIII century to the late V century BC. The first, "rather unsystematic/chaotic excavations" uncovered the top walls of Houses B–E and investigated some areas down to the bedrock. Few finds were retained, and the documentation is defective; these shortcomings have made the publication of this complex area even more difficult.[73] The excavations on the *Spina*, the upper, southern part of the Borgo, are not included in *San Giovenale* V:1 and V:2. Considering the multitude of tile fragments published from this area, only references to the relevant terracotta categories and types are presented here.

A number of tiles may with some credibility be assigned to House A: pan-tiles of Type I A, cover-tiles of Types I, II and III C, ridge-tiles of Type I (before the earthquake of 550/530 BC); pan-tiles of Type I and ridge-tiles of Type III (after the earthquake). In House C, Room Cb, were found one almost complete and one more than half pan-tile, but neither was retained nor even measured.[74] Many finds have probably tumbled down from the plateau south of and above the excavation (the *Spina*).

On the plateau, there are slight traces of "Some eight to ten Archaic houses, partly cut into the rock [...], with courtyards and adjacent *pozzi* (wells) [...] either located along the old Etruscan road to the Acropolis or more closely towards the edge of the Borgo". But later (Roman?) agricultural activities, including three *pestaruole*, probably working areas for the trampling or pressing of grapes, have almost obliterated the Etruscan buildings.[75] The upper parts of the wells were filled with roof-tiles and tufa blocks but, with great probability, these tiles are not preserved.

West of the Borgo NW, at the foot of the Acropolis, two later trenches through the fortifications yielded great numbers of roof-tiles: 345 fragments of pan-tiles, 69 of cover-tiles, and 3 of ridge-tiles (Trench A), 177 fragments of pan-tiles, and 92 of cover-tiles (Trench B). Only three pan-tile fragments were made of the lighter (yellow) clay. In Trench B, "stratum 3 [...] contained large amounts of [...] the earliest tile type, covered with a good red-slip dating to the last quarter of the 7th century".[76]

Borgo NW

Pan-tiles Types I A, I B, and I A or B.
Pan-tile with extremely high raised border.
Skylight-tile.
Alleged skylight-tile lids.
Cover-tiles Types I, II and III C.
Ridge-tiles Types I, III, and IV.

The *Spina*

Antefix? (see below, *Section 4*, *No. 5*, *Fig. 11*).
Painted revetment plaque (*Section 4*, *No. 8*, *Fig. 14*).
Revetment plaque with convex strigilation (*Section 4*, *No. 9*, *Fig. 15*).
Ram's head protome? (*Section 4*, *No. 12*, *Fig. 18*).

The fortification

Pan-tiles Type I.
Cover-tiles.
Ridge-tiles.

(L) THE PIETRISCO BRIDGE ABUTMENTS[77] (BACKE-FORSBERG 2005)

At the northern abutment of the bridge, three successive houses were erected between *c.* 565 and *c.* 200 BC. They were probably all covered with tiled roofs, and the finds of tiles below House 1 (building phase 1, 565–550/530 BC) show that

[72] Pohl 1985, 51–53.
[73] The quotations from *San Giovenale* V:2, 88, 91, 189. For the excavation campaigns of 1956–1957 (and 1958–1960?), see also *San Giovenale* V:1, 41 with n. 33, fig. 24.
[74] *San Giovenale* V:1, 124, figs 116–118, no. 12.
[75] Berggren & Moretti 1960, 3–5; *San Giovenale* V:1, 30, 34, fig. 13. Cf. Hanell 1962, 299f., fig. 267; Welin 1962, fig. 250.
[76] Karlsson 1999, 101, 105, 111, 113, 116, fig. 1.
[77] Called Bridge 1 in *San Giovenale* VI:2–3.

one or more tiled buildings were standing in the vicinity even earlier. Roof-tiles were found at the southern abutment, too.

Northern abutment

Pan-tiles Type I A and I B: p. 52.
Pan-tiles Type I A or I B: pp. 57 (phase 3), 62 table 4, 85, 89, fig. 94a nos 19–23.
Pan-tile painted white-on-red (see below, *Section 4*, *No. 3*): p. 141 (House 1?).
Pan-tile with extremely high raised border: p. 52, fig. 94a no. 24.
Cover-tiles Type I: pp. 52, 88f. (pre-construction phase 3).
Cover-tiles Type II: p. 52.
Cover-tiles: pp. 62 table 4, 85.
Ridge-tiles Type I: pp. 53, 88f. (phase 1), 88 (pre-construction phase 3), fig. 94a no. 26.
Ridge-tiles: pp. 62 table 4, 85.
Antefix? (*Section 4*, *No. 6*, *Fig. 12*): p. 62 table 4.

Southern abutment

Pan-tiles Types I and II: *San Giovenale* VI:2–3, app. 1, 297f. nos 81?, 85–88, 94–96 (*tegulae* 45–47. 91, 93-96) and n. 1086, 291.
Pan-tiles with high raised border: *San Giovenale* VI:2–3, app. 1, 288 no. 97 (*tegula* 48).
Cover-tiles Types I and II: *San Giovenale* VI:2–3, app. 1, 284 no. 46, 291.
Ridge-tiles: *San Giovenale* VI:2–3, app. 1, 287 no. 81? (*kalypter* 3), 288 no. 98 (*kalypter* 1, Type I?), 291.

(M) PORZARAGO NECROPOLIS (*SAN GIOVENALE* I:5)

Three tombs in the Porzarago Necropolis (north of the Acropolis), excavated between 1956 and 1960, contained roof-tiles: two pan-tile fragments in Tomb 1 (VI century BC) of "light red well sifted clay", two fragments of ridge-tiles in Tomb 2 (600/525 BC) of "very coarse yellow-brown" and "coarse light buff clay", respectively. Both tombs were apparently robbed during the Middle Ages and, considering the descriptions of the clays, the tiles were probably late intrusions, even though true ridge-tiles were rare from the Roman Empire onwards.[78]

The main chamber of Tomb 13 was reused for a Roman *tomba alla cappuccina*, with four pan-tiles dated by coins to the mid-III century AD.[79] A small ridge-tile fragment could perhaps, because of its "brick-red sandy" clay belong to the original burial, dated to 650/575 BC.
Pan-tiles: pp. 27 no. 51 (Tomb 1), 84f. nos 53, 58f., fig. 41 (Tomb 13); Bengtsson 2001, 101 n. 131, 102 n. 136; Berggren & Moretti 1960, 49.
Ridge-tiles: pp. 32 nos 86f. (Tomb 2), 84 no. 54 (Tomb 13).

(N) CASALE VIGNALE

This height north of Vignale constituted a major necropolis from the VII to the IV/III century BC, but afterwards became the centre of a *villa rustica* with Roman tiles. The canaletto of Tomb 50, excavated in 1990, contained various roof-tiles, perhaps the remains of a small building on top of the tumulus.[80] The original date of the tomb is *c*. 650 BC, but it was apparently reworked for a later burial.[81]
Pan-tiles: Ricciardi 1991, 36; Tobin 2015, 164 no. 212.
Cover-tiles: Ricciardi 1991, 36; Tobin 2015, 164 no. 212.
Antefix (see below, *Section 4*, *No. 7*, *Fig. 13*): Moretti Sgubini & Ricciardi 2011, 82 n. 36, fig. 4.
Roman pan-tiles: Hemphill 2000, p. 46 item 60.

(O) VIGNALE

In 1959 and 1960, a series of soundings were made on the Vignale Plateau, south-east of the Acropolis, yielding remains of Etruscan houses and pottery from the Iron Age at least to the III century BC. From 2006 onwards, the area was the subject of the extensive survey, the "Vignale Archaeological Project" (*San Giovenale* VI:2–3, 50–55, figs 26f.).
Etruscan pan-tiles Type I: Hemphill 2000, 44 items 55, 57. *San Giovenale* VI:2–3, 86 no. 6, 131–133 nos 72, 74–77, 139, 190 nos 143, 145, 197, 262, figs 115f., tables 5, 9, 13.
Pan-tiles Type II: Backe-Forsberg 2005, 87 n. 472: *San Giovenale* VI:2–3, 131 no. 71, 139, figs 107, 115f.
Pan-tiles with high raised border?: *San Giovenale* VI:2–3, 131 no. 73, 190 no. 144, fig. 107.
Cover-tiles: *San Giovenale* VI:2–3, 118 no. 13, 132f. no. 78, 139, 148 nos 88f., 193 no. 170, 197, 262, figs 115f., 124, tables 5, 9, 13.
Ridge-tiles: *San Giovenale* VI:2–3, 193 no. 169, 197.
Later tiles with lighter clay: *San Giovenale* VI:2–3, 139.
Roman pan-tiles: Hemphill 2000, 44f. items 55, 61; *San Giovenale* VI:2–3, 86 no. 6, 268.

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[78] Ö. Wikander 1989, 200–202.
[79] Cf. also Welin 1962, 284; Gierow 1986, 28; Tobin 2015, 55, 177 no. 251.
[80] For an aerial view of the tumulus, see *San Giovenale* VI:2–3, fig. 213.
[81] Ricciardi 1991, 35–37, figs 11f.; Tobin 2015, 53, 164 no. 212, figs 8, 38. See also Backe-Forsberg 2005, 140 n. 847: "I have noticed traces of tile-covered tombs on the south-western part of Casale Vignale" (not mentioned in *San Giovenale* VI:2–3). Cf. Hemphill 2000, 44 item 54.

Terracotta protome? (see below, *Section 4*, *No. 13*, *Fig. 19*): Backe-Forsberg 2005, 115 with n. 651.
Early mediaeval pan-tiles: *San Giovenale* VI:2–3, 139, 268, figs 17 right, 121.

3. Technical features

"Beyond the extent of the tufa, clay is widely available [...] Any of these beds could serve as a source for tiles, daub, and pottery."[82] Lying below the tufa bedrock, the clay comes to light in the deep river valleys around the Acropolis. Clay beds have been attested both north of the site and along the beds of the Vesca and the Pietrisco.[83] Fuel was easily available from the vast deciduous woods in the surroundings (various species of oak in particular),[84] and the large quantity of water necessary for the preparation of the clay was easily accessible if the workshops were situated in the river valleys—in fact, their most likely location, as clay is more expensive to transport than tiles.[85] If so, clay and water were available on the spot, and the customers were living in the immediate neighbourhood, but still protected from smoke and showers of sparks. No remains of the kilns for either pottery or tiles have yet been discovered, but local workshops have obviously existed in or, more probably, in the close vicinity of the town.

A pan-tile fragment from the Borgo proved to contain nearly 40% temper—an extremely high figure—consisting almost exclusively of specks of crushed tufa.[86] Such specks are characteristic for the San Giovenale tiles in general and are to be found also in the pottery—a strong indication of local production.[87] San Giovenale roof-terracottas generally have an unusually high percentage of temper, and materials other than tufa are also mentioned: minerals such as mica, augite, and other black particles.

There is reason to believe that the temper also included grog (*chamotte*)—crushed pottery or tile, which reduces the shrinking of the clay and makes it firmer. Grog is used in the production of tiles and bricks in the present day, and it is a constant occurrence in Acquarossa tiles. Five terracottas from that site even have small pottery sherds embedded in the clay's underside,[88] but I have not seen any example of this in the San Giovenale material. A group of tiles from Area E included "rather substantial stones" and such pebbles are also to be found in pan-tiles from the southern Pietrisco Bridge abutment.[89]

Most tiles from San Giovenale are fired reddish-brown, orange-brown/red or brown, often throughout, sometimes with a grey or even black core—a phenomenon typical for the Archaic period, but replaced at most sites towards the end of the VI century BC with lighter clays.[90] Pohl divided the Archaic tiles from Area E into those very coarse with abundant tempering and the less common ones with "a more depurated clay, with the normal grit [...] less well fired with a black core". This may perhaps correspond to Lars Karlsson's division of the dark tiles from *Pozzo* 1 and House I in Area F East into

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[82] S. Judson in *San Giovenale* V:1, 38, fig. 17. Cf. Hemphill 2000, 19–21, fig. 1:2–4.

[83] Backe-Forsberg 2005, 116f. with n. 664. Cf. Hemphill 1993, 46, fig. 2; Tobin 2015, 11, fig. 4. For the analyses of 16 clay samples collected north-east and south of the Acropolis, see Lindahl *et al*. 2006, 91, 93, fig. 5.

[84] Hemphill 2000, 21; Bengtsson 2001, 12f. Cf. also the charming essayistic account in Fries 1962, 236–250.

[85] Helen 1975, 44f.

[86] Ö. Wikander 1981, 70f. with n. 14; 1993, 104; Ö. Wikander in *San Giovenale* V:1, 179. The analysed fragment (find group 63-139a) was found in Room Bc (later Ca), dated to the VI century BC (*San Giovenale* V:1, 116; V:2, 95). It has light brown clay and slip, with traces of red paint.

[87] White specks are to be seen, particularly, when the upper surface is badly worn. See, for instance, Ö. Wikander 1981, figs 3 no. 12, 4 no. 26, 7 no. 29, 10 nos 40, 42, 44, 15; *San Giovenale* III:3, 79 no. 57, 81 fig. 65; IV:1, figs 52, 57f., 208. Cf. *San Giovenale* III:3, 92 on "white porous volcanic specks" in local red-slip ware, and *ibid*., 84, on Iron Age pottery: "The same particles occurred in later local archaic pottery, and the white specks were especially typical of the clay of local ware"; *San Giovenale* III:1, 20 (handmade primitive impasto).

[88] Ch. Wikander 1988, 57f.; Ö. Wikander 1993, 103f., figs 63f.; Cuomo di Caprio 1985, 54f. Cf. Vitruvius II.5.1 (concerning the production of mortar): *Etiam in* [*harena*] *fluviatica aut marina si qui testam tunsam et succretam ex tertia parte adiecerit, efficiet materiae temperaturam ad usum meliorem*.

[89] *San Giovenale* II:2, 43 no. 32; III:3, 81 (Area E); IV:1, 61; VI:2–3, 287f. app. nos 1, 81, 86f., 97. "Limestone pebbles [...] are plentiful in the beds of the Vesca river. They occur also in the conglomerate immediately below the tufa on the south side of the San Giovenale promontory" (S. Judson in *San Giovenale* V:1, 38). Pebbles are to be found also in local San Giovenale pottery: *San Giovenale* IV:1, 118 (coarse cream ware), 119 (red-on-white impasto), 132 (dolia). In architectural terracottas, pebbles are frequent at Poggio Civitate (Ö. Wikander 2017, 131), but occur only occasionally at Acquarossa (Ö. Wikander 1993, 104). For the detrimental effects of admixing limestone with the clay, see Vitruvius II 5.2–3; Blake 1947, 302 with n. 25. Sand used as temper is mentioned explicitly only concerning the ridge-tile fragment from Tomb 13 in the Porzarago necropolis, but "Stream sands, rich in volcanic particles, could be a source of temper for tiles and pottery" (S. Judson in *San Giovenale* V:1, 38). *Contra*: "For traditional tile-making in modern Sweden, it is pointed out that sand is unsuitable as a temper for roof-tiles" (Ch. Wikander 1988, 58 n. 18); cf. Vitruvius II 3.1. For the pros and cons of sand as temper, see Blake 1947, 301f.

[90] Ö. Wikander 2017, 140–144. Rome is an exception, with lighter clays in the early VI century BC.

"compact" and "loose" clays. The fine, compact clay is reddish with a brownish-grey core and few inclusions. The coarse and loose clay is reddish-brown with dark grey core and large amounts of inclusions. The surface dissolves easily in contact with water.[91] The earlier(?), loose-clay tiles include Type I A pan-tiles, Type I(?) cover-tiles and Type I ridge-tiles, those of the later(?), compact clay Type I B pan-tiles and a skylight-tile.

In the Borgo, most tiles are fired the same dark colour throughout; only a few have a grey or black core.[92] The dark clays dominate completely and only 14% of the fragments are light brown or beige/buff. The forming of the tiles was certainly accomplished in the same way as at other sites in Central Italy,[93] but traces left by the wooden frame are rare, particularly on pan-tiles.[94] The furrows formed on the tile plaque by the workman's thumbs along the raised borders are seen only occasionally.[95]

After the forming, the underside of some pan-tiles and several ridge-tiles was somewhat smoothed. One ridge-tile fragment from House V in Area C was even slipped on its underside. Some pan-tiles are bevelled on the underside of the lower corners, in order to make them rest securely on the upper end of the next (lower) one (see below, *Fig. 10*). The instrument used was presumably a knife or a thread, as appears most clearly from a pan-tile on which the traces of the cutting show that the clay had already begun to harden.[96] More difficult to understand are the bevels found occasionally along a great part of the outside lower edge of the raised border, either continuing right up to the corner or leaving the underside of the very corner intact. Similar bevels are in evidence at both Acquarossa and Poggio Civitate,[97] but I have no explanation to offer. Such bevels on the back of revetment plaques with convex strigilation (see below, *Section 4*, *No. 9*) may be intended to reduce their weight, but such a purpose seems little likely regarding a pan-tile.

Imprints of fingers on the bottom edge of a cover-tile were caused by the workman moving the tile to the drying area, where domestic animals could walk upon the tiles leaving imprints of hooves.[98] The cover-tiles were left to dry without any support, a procedure that made some of them warp and collapse.[99] Whether the same is true concerning the ridge-tiles remains an open question. I have not observed any sign of warping, nor any holes for wooden supports on the underside (as occasionally at Acquarossa), but the preserved fragments are too few to allow us to draw any conclusions *e silentio*. Anyhow, the tiles must still have been resting on the forming support when the cordons were applied.

As already pointed out, the Archaic tiles are well fired (better than at Acquarossa and Poggio Civitate), almost certainly in kilns. Dark grey and black cores are rare, but whether this is the result of high temperature, long time in the kiln or more efficient oxidation is impossible to say without thermal analyses.[100] A temperature between 600 and 900° C seems likely—probably closer to the higher figure than to the lower.

Even though many tiles are so badly worn that the surface layer is totally missing, it seems a reasonable assumption that they, too, were once covered with a reddish-brown, brownish-

[91] *San Giovenale* III:3, 81 nos 26–29 (I. Pohl); IV:1, 60–63, 66, 76, 133, 161f. (L. Karlsson). The tiles from the Pietrisco Bridge abutments have been divided into four groups: a, b and d with darker clays and c with reddish-yellow clay.

[92] Ö. Wikander in *San Giovenale* V:1, 179, fig. 151; Ö. Wikander 2017, 142 item 11b. Dark cores are less rare in ridge-tiles.

[93] Ö. Wikander 1993, 104–110; 2017, 131–134. For a summarizing discussion of the manufacturing process, see Winter 2009, 511–526.

[94] For an example, see *San Giovenale* V:2, pl. 107 no. WA-1708. For examples on cover-tiles, Ö. Wikander 1981, fig. 6 nos 27, 33f., 36–38; *San Giovenale* V:2, pl. 108 nos A:d-2-4-713, -716, R-58, WA-1735. Cf. Ö. Wikander 1993, 104 n. 34.

[95] *San Giovenale* III:3, pl. 24 no. Fl 1-29; IV:1, 62 no. 17, fig. 61, pl. 18; V:2, pl. 107 no. A:d-2-4-690; Backe-Forsberg 2005, fig. 94a no. 21. Due to the heavy wear of the tile surfaces, the marks left by the working stick—very common at Acquarossa (Ö. Wikander 1993, 105f., fig. 38)—are mostly obliterated. For an exception, see Ö. Wikander 1981, fig. 3 no. 10. At Poggio Civitate, too, most tiles are too worn to preserve marks of the working stick (Ö. Wikander 2017, 132).

[96] Ö. Wikander 1981, 76 figs 2 nos 16f., 5 nos 17, 23 (traces of cutting), 24; 1993, 125, 126 n. 169; 2017, 150 n. 212; *San Giovenale* IV:1, 60, 62, 133 no. 8, fig. 56, pl. 17; V:2, 35 no. A:c-7/6-26, 186 nos WA-1692, WA-1716, pl. 107.

[97] Ö. Wikander 1981, 76 figs 2 nos 4, 13, 5 nos 4, 13 (San Giovenale); 1986, 98, 165, 242f., 247, Teg F 27, G 8, N 8, 15, O 6, 8, figs 90, 107, 120, 125, 136, 139; 1993, 126 (Acquarossa); 2017, 24 Teg 43, fig. 3 no. 49 (Poggio Civitate).

[98] Fingers: Ö. Wikander 1981, fig. 6 no. 37. Hooves (probably of sheep or goat): Ö. Wikander 1981, 71 no. 1; 1993, 114 n. 96, 118 n. 122; 2017, 137; *San Giovenale* V:2, 88 no. B:c-2-3-12. This is the only example known to me of an animal imprint from San Giovenale, particularly interesting because of the dark red paint evenly spread inside the three up to 0.5-cm-deep impressions (Ö. Wikander 2017, 137). The pan-tile fragment was found in the Borgo, House B Room C, and should be dated to the early(?) VI century BC (find group 62-174b).

[99] Ö. Wikander 1981, fig. 6 no. 38. The most extreme example comes from the Borgo: *San Giovenale* V:2, 63 no. A:f-31, pl. 108; Ö. Wikander 2017, 136 n. 60.

[100] Ö. Wikander 1993, 118–121, 165, 167; 2017, 139f. Ö. Wikander in *San Giovenale* V:1, 179, fig. 151. Terracotta can be baked over an open fire, where temperatures up to 940° C have been reported (Shepard 1980, 83; cf. Cuomo di Caprio 1985, 186). Nonetheless, built kilns make a better supervision of the process possible, and tile kilns are known from Tarquinia as early as *c.* 650 BC, at the very beginning of tile production in Italy (Baratti & Mordeglia 2009, 84–86, 90). In general, see Ch. Wikander 1988, 71–73, with ample references.

red or orange slip, in its turn covered with red paint,[101] and the same is apparently the case with tiles from other sites. One ridge-tile shows clear traces of the brush used to apply the paint.[102] The precise moment in the manufacture process when the slip and paint were applied has caused much debate. But it has been made clear by a pan-tile fragment of Type I, whose bevel under the lower corner is covered with red paint—something that must have happened after the tile had left the worktable.[103] The red paint, abandoned at most sites after the VI century BC, was retained at San Giovenale at least until *c*. 400 BC, as demonstrated by a Type II pan-tile from Area F, House XI.

Pohl did not accept the lighter Borgo tiles as examples of the later, paler terracotta and instead produced as such a group of tiles from Area B with clays described as greenish yellow-cream, red or pink buff, brownish-pink, rose-brown or pink-brown; their slip as pink-red, buff, greenish cream, cream, or pink-cream.[104] From upper strata in Area F East come a number of tiles with clays described by Karlsson as compact greenish-grey white with pink core or yellowish-white. From Casale Vignale, finally, Pamela Hemphill reports some green Roman tiles.[105]

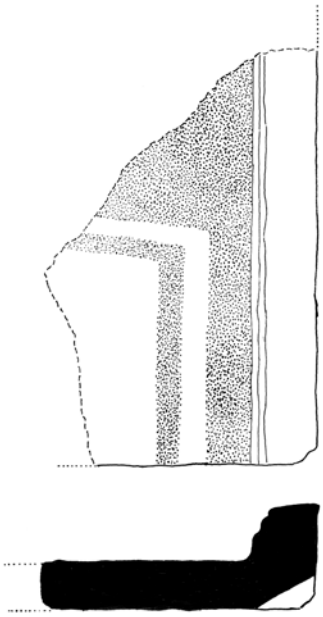

Fig. 10. Painted pan-tile No. 2, *from Area F East. Drawing based on* San Giovenale *IV:1, pl. 17 no. 7.*

4. Decorative terracottas

Few architectural terracottas with painted or plastic decorations have come to light at San Giovenale.[106] Still, the varying categories—often represented by only one specimen each—show that such decorations were not quite as rare as first assumed. It is worthy of note that the two fragments of revetment plaques with convex strigilation (see below, *No. 9*) come from such distant findspots that they can hardly have decorated the same building. All datable pieces seem to belong to the VI century BC (or the very end of the VII).

PAINTED PAN-TILES

Three tiles decorated with red and white paint have been published. In the case of the fragment from Area F East (*No. 2*), there is no doubt about its identity as a pan-tile of Type I A, whereas the scant information supplied concerning the other two does not exclude that we may be dealing, instead, with painted revetment plaques.

No. 1. Area B, Test-Pit K, surface find. "Light-grey clay. Surface very light brown. Traces of painted, white band along edge". The pottery from the test-pit was mainly Sub-Apennine impasto, with small numbers of primitive impasto and mediaeval sherds, and Archaic and mediaeval tiles.
Bibl.: *San Giovenale* II:2, 43 no. 34.

No. 2. Area F East, *Pozzo* 1. "Clear traces of red paint (painted square?)", apparently red on a light ground—a very rare technique, possibly inspired by the, at the time, almost obsolete red-on-white pottery. A few examples are known from Acquarossa and Poggio Civitate.[107] Th. 2.5 cm. Date: VI century BC? *Fig. 10*.
Bibl.: *San Giovenale* IV:1, 60 no. 7, 162, fig. 55, pl. 17; Ö. Wikander 2017, 176.

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[101] Ö. Wikander 1993, 117 n. 119; Ö. Wikander in *San Giovenale* V:1, 179, fig. 151.

[102] Ö. Wikander 1981, fig, 10 no. 56. On the use of a brush, cf. Ö. Wikander 1993, 118 (Acquarossa); 2017, 137f. (Poggio Civitate).

[103] Ö. Wikander 1981, fig. 2 no. 16 (from the Borgo). On the discussion, see Winter 2009, 523 n. 88; Ö. Wikander 2017, 137.

[104] *San Giovenale* II:5, 40 nos 237, 242, 43 nos 60–66, 50.

[105] *San Giovenale* IV:1, 61–63, 66, 76f., 81, 99, 163 (all Type II pan-tiles from Area F East have a "very compact, greenish-grey-white clay with pink core"); Hemphill 2000, 46 item 66 (Casale Vignale); Ö. Wikander 2017, 142 item 11a.

[106] It is to be regretted that all four decorative terracottas from the Borgo (below, *Nos 5, 8f., 12*) were found during the soundings in 1957. "Of these activities, fairly little documentation remains and only a few finds have been preserved". Not even the formal report on the season has been retained (*San Giovenale* V:1, 41 with n. 33). The Borgo pan-tile with extremely high raised border has the same origin. These fragments are indicated here with the letters EKB.

[107] Acquarossa: Ch. Wikander 1988, 70 (five revetment plaques and one antefix, all from the same building). Poggio Civitate: Ö. Wikander 2017, 138f., 178 (two ridge-tiles and one cut-out akroterion).

Fig. 11. Female head antefix, ex voto *or* patrix*(?)* No. 5*, from Borgo NW, presumed to derive from the* Spina *above (=* San Giovenale *V:1, fig. 14).*

No. 3. Pietrisco Bridge, House 1? "one piece of red-and-white painted pan-tile".
Bibl.: Backe-Forsberg 2005, 141, 160.

RIDGE-TILE CORDONS

No. 4. While both painted and plastic decorations are far from rare on Archaic, Central Italic ridge-tiles in general,[108] San Giovenale has no more to offer than the plastic cordons on Types I and II.[109] Like Acquarossa, San Giovenale has a long tradition of such cordons on jars and dolia. When not too worn, the cordons appear carefully made and, with few exceptions, of the type I have called b.[110] At Acquarossa, too, cordon b is the most common (61% of the horizontal ones), but not almost totally predominant as at San Giovenale.

The width of the horizontal cordons varies from 1.9 to 5.0 cm (average 4.1 cm), the height over tile surface from 0.7 to 2.4 cm (average 1.6 cm). They are, thus, much bigger than those from Acquarossa, where the average measurements are 2.6 and 1.3 cm, respectively.[111] The distance between notches is reported for only seven Type I ridge-tiles. They vary between 2.0 and 3.5 cm, with an average of 2.9 cm—almost the same figure as for their counterparts from Acquarossa (3.0 cm), but considerably longer than at Poggio Civitate (1.8 cm).[112] For the three notched Type II specimens, the figure is *c.* 2.8 cm.
Bibl.: Ö. Wikander 1981, fig. 10 nos 39f., 42 (cordon c), 44f.; 1993, 72, 140, 152 n. 57, 160; Backe-Forsberg 2005, fig. 94a no. 26; *San Giovenale* IV:1, figs 51, 208.

ANTEFIXES

Only one antefix (*No. 7*) has been identified with certainty at San Giovenale. At Acquarossa, about one third of the buildings had cover-tiles equipped with some kind of closing device,[113] and their rarity at San Giovenale is remarkable.

No. 5. The Borgo (EKB). A female terracotta head was discovered in 1957 "somewhere in the northern part of the western area or over the alley behind houses B and C". It was a surface find, and Nylander suggests that it originally derives from an obliterated sanctuary on the *Spina*, the rather flat plateau above Borgo NW. Its identification as an antefix is, however, doubtful, and Arvid Andrén vigorously questioned the interpretation. His arguments are strong, and it is no surprise that Winter (2009) did not recognize the piece as an antefix. It is a bit on the small side (pres. W. 10.0 cm, pres. H. 12.5 cm), it shows no trace of a cover-tile backer, and the polychromy (red and black) is odd. Andrén also questioned the alternative identification as a votive offering and suggested that we may be dealing with a *patrix*, a model for antefix moulds. If this is correct, we would still have additional evidence for the use of antefixes at San Giovenale. But why paint a *patrix* at all? To me, an *ex voto* seems preferable. Date: *c.* 520/510 BC. *Fig. 11.*
Bibl.: Berggren & Moretti 1960, 3, fig. 1; Boëthius 1960, 311, fig. 271; Hanell 1962, 299, fig. 282 (*ex voto*); Andrén 1971, 12f., pls XXXII:70f.; Barbieri *et al.* 1986, 62, 105 no. 201; Nylander 1986, 45 n. 28; Winter 2009, 514 n. 38 (*patrix*?); *San Giovenale* V:1, 34 with n. 22, 150, fig. 14; V:2 191 no. 26; VI:2–3, 181 (*ex voto*); Ö. Wikander in *San Giovenale* V:1, 180.

No. 6. Pietrisco Bridge. A fragment described as "antefix?" and "terracotta lid or architectural terracotta" was found in House I, Room B, in a pre-earthquake stratum (inv. no. 63-625). It consists of a circular disc with three concentric ridges separated by wide, concentric grooves. Even though the interpretation as a vase lid cannot be excluded, the piece has more

[108] Ö. Wikander 1993, 140f., 154; 2017, 173f., 177f.
[109] I do not include here the ridge-tile end-plaque (p. 125), whose triangular holes are functional rather than decorative (Ö. Wikander 1993, 65).
[110] Ö. Wikander 1986, fig. 2; 1993, 140f.; 2017, 173f.
[111] The measurements are taken from eleven ridge-tile fragments published in Ö. Wikander 1981, four from *San Giovenale* V:2, pl. 108 (measured from profile drawings), and one from *San Giovenale* IV:1, pl. 17. For Acquarossa, see Ö. Wikander 1993, 141, fig. 53a–b.
[112] Ö. Wikander 1993, 141, fig. 53c; 2017, 173f.
[113] Ö. Wikander 1993, 76, fig. 33.

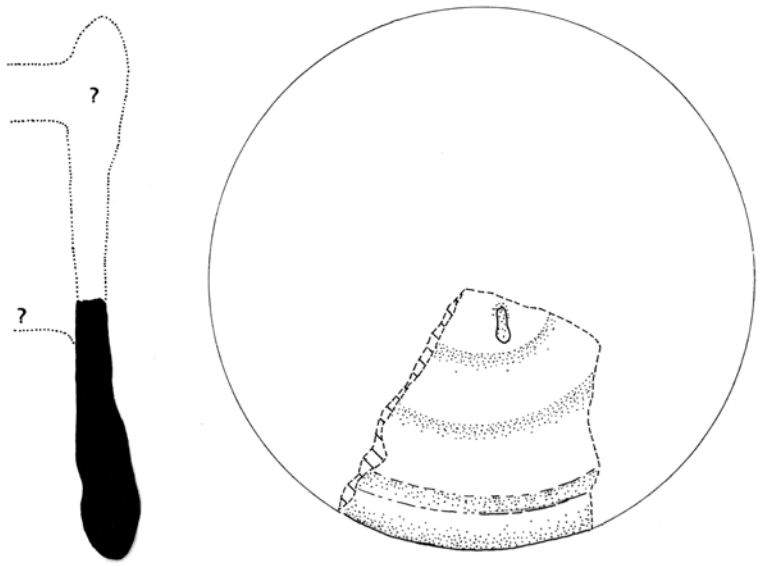

Fig. 12. Disc antefix(?) No. 6*, from Pietrisco Bridge. The part of the profile drawing reconstructed with dots presupposes identification of the piece as an antefix and remains hypothetical. Drawing based on Backe-Forsberg 2005, fig. 94a no. 27.*

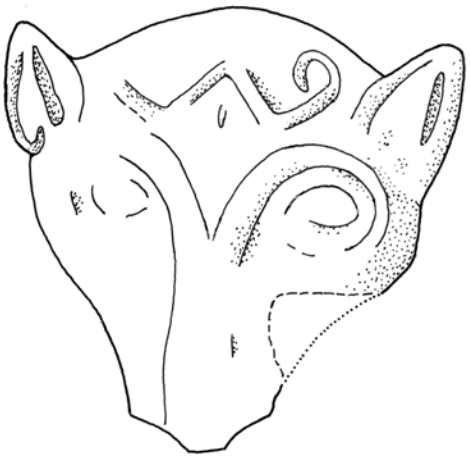

Fig. 13. Panther antefix No. 7*, from Casale Vignale. Drawing based on a photograph in Moretti Sgubini & Ricciardi 2011, fig. 4.*

in common with Type VII antefixes from Acquarossa. But the ridges are less pronounced, and the dimensions are slightly smaller:[114] diam. *c.* 14 cm vs 17 cm at Acquarossa.[115] If we are dealing with an antefix, the fragment must derive from its lower part, as there are apparently no traces of the cover-tile. Date: 580/550 BC? *Fig. 12.*
Bibl.: Backe-Forsberg 2005, 62 table 4, fig. 94a no. 27.

No. 7. Casale Vignale Necropolis, Tomb 50. A panther's head antefix was found in 1990 together with plain roof-tiles, perhaps deriving from a building on the tumulus. Pres. H. 13.5 cm, pres. W. 13.5 cm. On the whole, the rendering of the feline has much in common with the panthers discovered at Acquarossa.[116] Date 590/570 BC? *Fig. 13.*
Bibl.: Moretti Sgubini & Ricciardi 2011, 82 n. 36, fig. 4.

SIMAS

If the pan-tiles with extremely high raised borders are not, as I have suggested, rudimentary, undecorated raking simas and the Vignale ram's head (*No. 13*) is not a water-spout, no fragment of any sima has come to light at San Giovenale. The raking simas shown on the reconstruction of House I (period 3) in Area F East have no factual foundation whatsoever,[117] and the alleged lateral sima from Test-Pit H in Area B is presumably only a pan-tile with high raised border. I do not know to what Karlsson is referring when mentioning in passing "two possible sima fragments" from Area F East.[118]

REVETMENT PLAQUES

In contrast to simas, revetment plaques are attested with certainty at San Giovenale: two unmistakable fragments and two possible ones.[119]

[114] According to Backe-Forsberg 2005, fig. 94a no. 27, the published drawing is at 1:2 scale, but the author kindly informed me that the true scale (like that of no. 24 in the same figure) is, in fact, 1:4.
[115] Ö. Wikander 1986, 133 nos Ant F 18–20, figs 69, 71; 1993, 75; 2017, 90. Fragments of similar antefixes from Veii have the same dimensions as those from Acquarossa: Belelli Marchesini 2011, 182 with n. 41; Sarracino 2012, 93f., figs 21–23.
[116] Ö. Wikander 1993, 150–152, fig. 58. It cannot be excluded that one of them (Sima G 23) is also part of an antefix rather than a lateral sima. Cf. Winter 2009, 172 no. 3.C.1.b, ill. 3.3.3.

[117] *San Giovenale* IV:1, figs 292f.; Ö. Wikander 2017, 155 n. 260.
[118] *San Giovenale* II:2, 43 no. 32 (Area B); IV:1, 134 (Area F East).
[119] I abstain from including a small (5.5 × 4 cm) fragment from the Borgo (West Area) published by I. Pohl as an architectonical plaque(?): *San Giovenale* V:2, 187 no. WA-1742. Nor do I include another fragment from the West Area in the Borgo with two uneven walls meeting at a right angle, as on *No. 8*, and with two nail-holes in the horizontal(?) part (*San Giovenale* V:2, 184f. no. WA-1635, pl. 104). The clay is reddish-brown as in most roof-terracottas, but Pohl found all dimensions "too small for an architectonical revet-

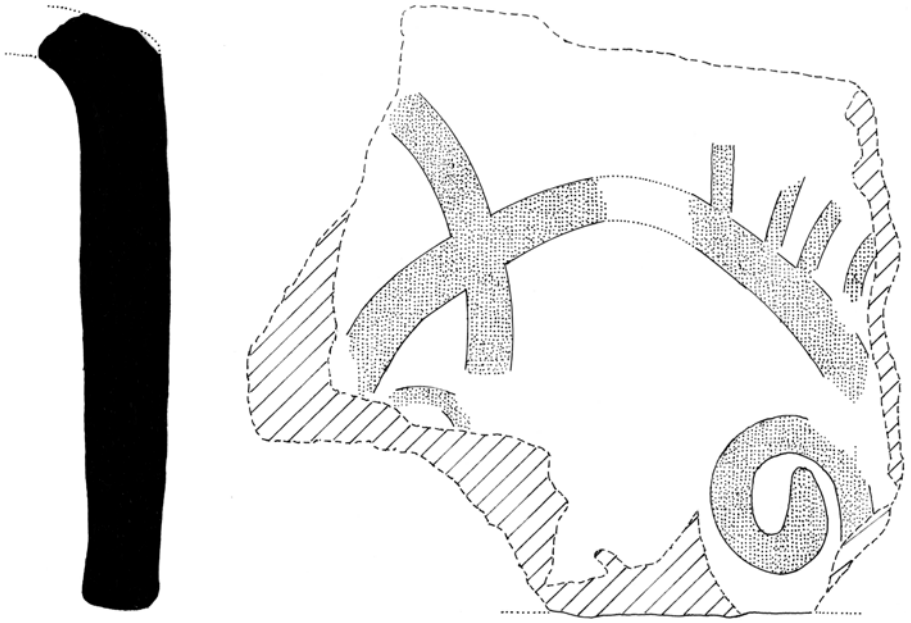

Fig. 14. Painted revetment plaque No. 8*, from the* Spina *above Borgo NW. Decoration in white paint is indicated by dotting. Drawing based on a photograph in Ch. Wikander 1988, fig. 6. The profile is a combination of sections taken at two different parts of the plaque.*

No. 8. The Borgo (EKB). A painted plaque found in 1957 on the *Spina* in "*cantina per vino* 1", apparently of the same type as Acquarossa Type II B.[120] The fragment preserves almost its total height (14.2 cm; estimated complete H. *c.* 16 cm; Th. 1.7–2.1 cm) and the beginning of the horizontal part on its back.[121] The clay is brown with a grey core. It is decorated with a plastic cordon along the bottom edge and with white-on-red-painted patterns, among them a volute and two interlaced semicircles.[122] Both motifs are known from Acquarossa, but in completely different compositions.[123] Date: 625/575 BC. *Fig. 14*.
Bibl.: Ö. Wikander 1981, 86f. no. 63; 1993, 152 n. 57, 160; Ö. Wikander in *San Giovenale* V:1, 180; Barbieri *et al.* 1986, 101, 106 no. 202; Ch. Wikander 1988, 27, 73, 127, fig. 6; Winter 2009, 92 no. 2.D.1.b, 558.

No. 9. The Borgo (EKB). Revetment plaque with convex strigilation. One fragment was found in 1957 south of "House I" ("*cantina per vino* 1"), while another, better preserved, is a surface find from 1972, discovered in Area B or C. The strigils are very unevenly fashioned (modelled by hand?). The height of the cavetto is 6.5 and 7.0 cm, respectively. Parts of six strigils are preserved on each fragment, at an average distance of 2.4 and 2.5 cm, respectively. The clay is light brown to light reddish-brown, with a thick light to brownish grey core. The slip is light brown, covered with dark red paint on front. On the surface find, the concave strigil to the extreme right is covered with what looks like black paint, but the fact that the "paint" continues down onto the fascia below makes this interpretation less likely. Nail-holes are preserved on both fragments (diam. front 0.5–0.8 cm, back 0.3–0.4 cm), but so little of the fascia is preserved (pres. H. 1.4 and 2.4 cm; Th. 2.3–2.6 cm) that it cannot be determined with certainty if it was decorated in relief or paint. Considering the plaque's structural affinity

ment". In that particular respect, I do not share her views but, like her, remain unconvinced of the architectural nature of the piece.

[120] Ch. Wikander 1981, fig. 2; 1988, 22–25.

[121] The horizontal part of the plaque was obviously not produced separately and later joined to the vertical one. They were made in one piece and bent to an approximately 90° angle. The same method was often applied at Acquarossa, too, but it is interesting to note that the roofs explicitly mentioned in this connection by Ch. Wikander (1988, 63)—B:1, B:2, F:1 and F:2—all belong to the first two subphases (1A–1B), dated between 640 and 600 BC (Ö. Wikander 1993, 157, fig. 60). The Acquarossa examples were normally bent over some implement, sometimes leaving a clear impression in the clay (most obvious in a raking sima: Ch. Wikander 1988, fig. 16). But the more gentle bend on the San Giovenale plaque also has counterparts at Acquarossa: Ch. Wikander 1981, figs 89f., 92 nos Rev M 15, M 28, Sp 6.

[122] This fragment could seemingly provide some justification for B. Blomé's reconstruction of House B with revetment plaques along the gable rakes (Blomé 2001, figs 2f., 5; Ö. Wikander 2017, 155 n. 260); however it was obviously found on the *Spina* plateau *above* Borgo NW.

[123] Ch. Wikander 1981, fig. 81, Sima G 10; 1988, 105, 111, fig. 35, raking sima from Zone F (volutes), 111f., fig. 37, Rev F 97 (semicircles).

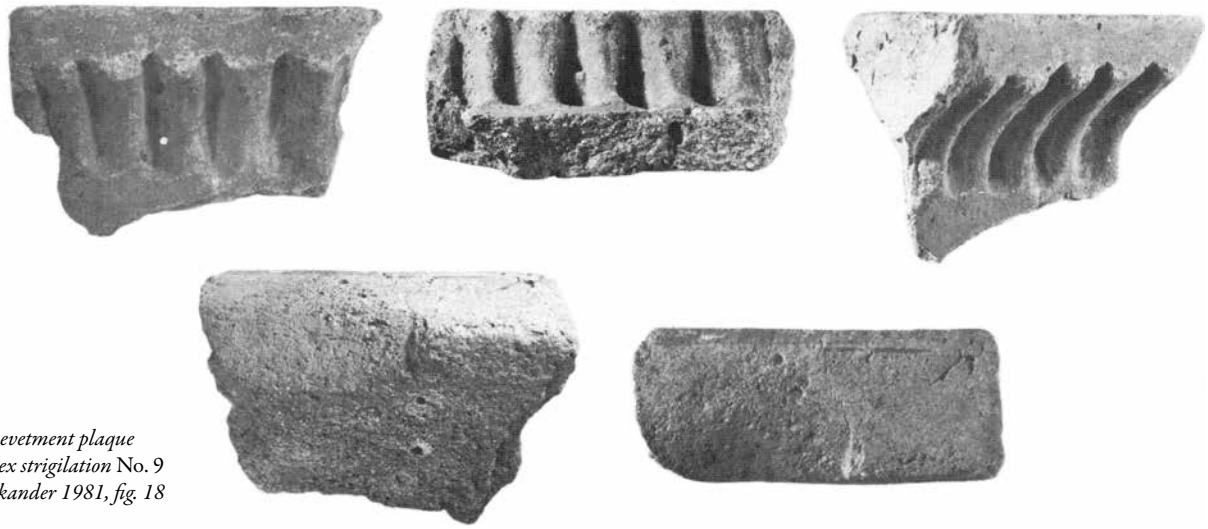

Fig. 15. Revetment plaque with convex strigilation No. 9 *(= Ö. Wikander 1981, fig. 18 no. 64).*

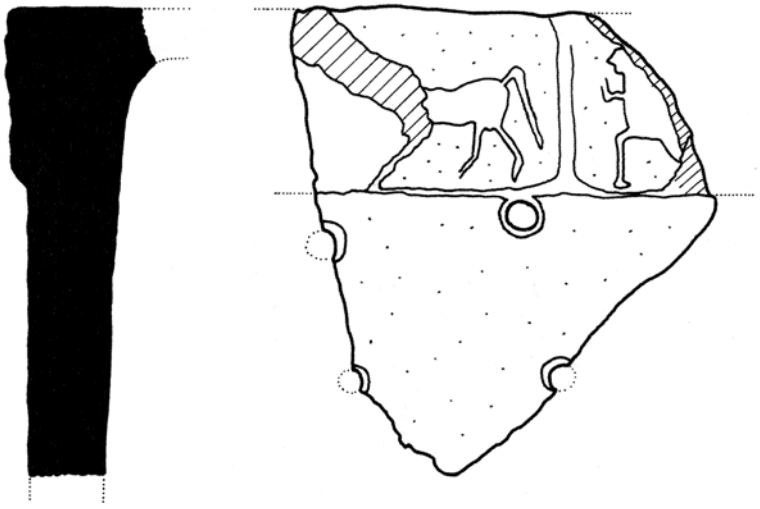

Fig. 16. Revetment plaque(?) with relief No. 10*, from Area F East (=* San Giovenale *IV:1, pl. 19 no. 95, with additions).*

with Acquarossa Type III,[124] the latter alternative seems preferable. Date: Probably early VI century BC. *Fig. 15.*
Bibl.: Ö. Wikander 1981, 87f., nos 64f., figs 17f.; Ö. Wikander in *San Giovenale* V:1, 180; Barbieri *et al.* 1986, 106 no. 203; Ch. Wikander 1988, 20, 29.

No. 10. Area F East, House III, Room B, stratum 1. Terracotta plaque (pres. L. 10.5 cm, pres. H. 11.8 cm) with four preserved nail-holes (diam. of the complete one *c.* 0.8 cm) and, on its back, the beginning of the upper, horizontal part. A low (H. 4.5 cm) relief frieze "with horse and centaur(?)" runs along the upper edge, whereas the 2.2-cm-thick fascia below preserves no traces of decoration. In view of its dimensions, motif and general appearance, the frieze is mostly reminiscent of the impressed bands on red-slipped dolia and "Caeretan" braziers. The fragment is completely without parallels. Karlsson (understandably) suggests some architectural use, whereas Winter (2009) does not mention the piece. There is reason to question its identity as a revetment plaque, but it is difficult to say what else it could be (mounting on furniture?). Date: early VI century BC. *Fig. 16.*
Bibl.: San Giovenale IV:1, 81 no. 95, 133, 162, fig. 110, pl. 19.

[124] Ch. Wikander 1981, 44, 67, 158, 162, figs 2, 19, 24, 34, 42, 93–95; 1988, 28f. The dimensions of the Acquarossa plaques are larger, but they share the nail-holes in the cavetto, the diagonal bevels (in order to reduce the heavy weight) and protruding knobs at the back, and probably the plain painted fascia. "[Acquarossa] Type III is indeed a variant, or possibly prototype, of the early Etruscan simas with strigil cavetto and low fascia with guilloche decoration, only adapted for a different function" (Ch. Wikander 1988, 29).

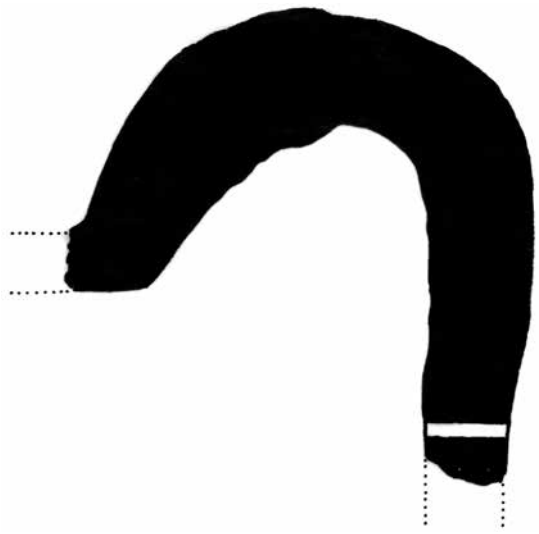

Fig. 17. Revetment plaque(?) No. 11*, from Area B. The drawing is a combination of sections taken at three different parts of the plaque.*

No. 11. In 1981, I published two odd pieces of terracotta—both surface finds, but one of them found near House V in Area C. They combine a flat plaque (pan-tile?) with a "cover tile", whose other long side continues at least *c.* 5 cm below the underside of the pan, where a nail-hole (est. diam. 0.6/0.7 cm) is preserved. One of them is complete in length: 55.5–56 cm. For want of something better, I published the pieces (very hesitatingly) as "revetment plaques?", but none of my three attempts at reconstructing them on paper seems satisfactory. To my knowledge, no other scholar has commented on them.[125] I here reproduce my least unattractive suggestion, in which the "cover-tile" is located above the revetment plaque as termination of the tile-roof at the gable. *Fig. 17*.
Bibl.: Ö. Wikander 1981, 84, 86, nos 61f., figs 13, 15, 16b–d.

TERRACOTTA PROTOMES

Protomes in the form of animal heads are known from Archaic Etruria both on large ceramic or bronze vases and on architectural terracottas. San Giovenale has yielded at least two ram's heads which may perhaps have had architectural use. The "extremely thick walls" of *No. 12* contradict its connection with a cover-tile, whereas Backe-Forsberg suggests that *No. 13* "may be a lateral acroterion, belonging to a civic or a sacred building on the Vignale". More exactly, she suggests a connection with a sanctuary dedicated to Hercle, "the protector of herds and shepherds".[126]

No. 12. The Borgo (EKB). Sporadic find, probably from "the northern part of the western area or over the alley behind house B and C". A protome representing a ram's head and neck (pres. H. 17 cm), with beginning of the object (cover-tile or large vessel?) to which it was once attached. Architectural use can be neither proved nor excluded.[127] Date: VI century BC. *Fig. 18*.
Bibl.: Berggren & Moretti 1960, 4, fig. 2; Hanell 1962, 299: Mark *et al*. 2004, 152; Backe-Forsberg 2005, 115, 150 ("probably architectural"); *San Giovenale* II:5, 12; V:1, 34, fig. 15; V:2, 191 no. Sp-25, fig. 15, pl. 104; VI:2–3, 135f., 181, 254, fig. 118; Ö. Wikander in *San Giovenale* V:1, 180.

No. 13. Vignale. Backe-Forsberg has identified a "large [pres. L. 20 cm] terracotta head of a ram with nail holes found in a cistern on the Vignale" (*Pozzo 6*). In the final publication, however, Backe-Forsberg and Richard Holmgren abandoned the identification of the four cavities as nail-holes and suggested, instead, that they represent ears and eyes. But, whereas terracotta rams have normally two pronounced jaws with an only slightly open mouth, the Vignale ram's mouth is replaced by a circular opening with a rounded rim—not even trying to imitate the mouth of an animal, but appropriate if the piece was, in fact, a hollow water-spout. If so, it would be a more skilfully manufactured parallel to the Acquarossa lateral sima with the San Giovenale one being a ram's head *constituting*, rather than placed *above* the spout.[128] Two very similar water-spouts, with the same circular "mouth", have been found in Campania.[129] Date: first half of the VI century BC. *Fig. 19*.
Bibl.: Backe-Forsberg 2005, 115 with n. 651, 150 with n. 973, fig. 105; *San Giovenale* VI:2–3, 131 no. 67, 134–139, 181, 219, 254, 262, figs 113, 152.

[125] In 1988, I injudiciously suggested that the fragments could be parts of undecorated gutter-tiles of a kind known from Hellenistic and Imperial times (Ö. Wikander 1988, 216 n. 122). The nail-hole makes, of course, that explanation impossible.

[126] I. Pohl, in *San Giovenale* V:2, 191; Backe-Forsberg 2005, 149f. There is, in fact, a raking sima with a lateral ram's head akroterion, perhaps from Veii and dated to 510/500 BC: N. Winter in Christiansen & Nielsen 2010, 42f. no. 8; *San Giovenale* VI:2–3, 135f., fig. 117.

[127] Fragments of two similar protomes have been found in Cistern 1 in Area B and a trial trench there. They come from different ram's heads but provide no further information on their nature (*San Giovenale* II:5, 30 no. 277, 50 [wrong number], fig. 1).

[128] Ö. Wikander 1986, figs 75, 77f.

[129] Scatozza Höricht 2006, 262f., fig. 26.4 (Pithekousai, 600/575 BC); Borriello 2006, fig. 28.1 (Cumae, *c.* 600 BC).

Fig. 18. Ram's head protome No. 12, *from the Borgo (= San Giovenale V:2, fig. 15).*

Fig. 19. Ram's head protome No. 13, *from Vignale (= San Giovenale VI:2–3, fig. 113, above). Photograph by R. Holmgren, ARCDOC.*

5. Chronology

In my preliminary report of 1981, I abstained from almost any attempt to date the tiles. San Giovenale still provides weak grounds for chronological conclusions, even though the (to me totally convincing) establishment of a devastating earthquake between 550 and 530 BC has somewhat improved the situation.[130] In this connection—as in most—Area F East and the Borgo are the most rewarding, together with data from the Pietrisco Bridge.

In Area F East, period 2 (= building phase 1, *c.* 675–625 BC) yielded no roof-tiles from Houses I and II. The 22 fragments recorded from House III, stratum 3B, were dismissed by Karlsson as "all intrusive".[131] But in period 3 (= building phase 2), concluded by the earthquake, all three houses had tiled roofs.[132] The pottery suggests an initial date of the third period around 625 BC. Even though this fact does not prove that the tiled roofs were constructed at that point of time, it seems a reasonable conjecture.[133] Tiles with greenish-grey-white clay were not found at all in *Pozzo* 1, filled up towards the end of the VI century BC, but occasional fragments were scattered over the area, mostly in the late post-Archaic stratum 1.[134]

The extensive finds from the Borgo should offer excellent opportunities for the study of the progress of the tiled roof, but unfortunately this is not unreservedly the case. House F was built with ashlars in 650/625 BC, but it remains uncertain if it was tiled. The few roof-tile fragments from Nylander's stratum 9 have little to say, as the "strata" were completely mixed.[135] Most buildings in the Borgo yielded so few fragments that no conclusions can be drawn (see *Table 2* above, p. 120). Nor are the finds from the West Area of any use, as they form part of the Great Fill Project (which totally transformed the area) in the late VII century BC. We are, thus, left with House A, but here conclusions are made difficult by the defective compatibility of information in *San Giovenale* V:1 (Nylander) and V:2 (Pohl), and by their use of totally different stratigraphies, floor numbers, and periodization.

[130] The idea of an earthquake as cause of extensive destruction at San Giovenale after the mid-VI century BC was first presented by Blomé *et al.* 1996 and further elaborated and substantiated in Blomé & Nylander 2001 and *San Giovenale* V:1, 138–142. Cf. Backe-Forsberg 2005, 90; *San Giovenale* IV:1, 162; VI:2–3, 261f. For (the same?) earthquake probably causing the abandonment of Acquarossa, see Ö. Wikander 1993, 133f.

[131] *San Giovenale* IV:1, 67–71, 146 (House I), 78–80 (House II, *contra* p. 158), 109 (House III).

[132] *San Giovenale* IV:1, 155, 161f.

[133] Accepted by N. Winter (2009, 558), too. Like many of the excavators, I once dated the earliest San Giovenale tiles to 650/630 BC (Ö. Wikander 1992, 158), but there is, in fact, nothing to support this early date.

[134] *San Giovenale* IV:1, 62 no. 17, 134, 163 (period 4, after the earthquake).

[135] *San Giovenale* V:1, 69; V:2, 131.

Most of the 75 tile fragments published by Pohl from the area do not derive from House A itself, but from the adjacent Yard A:d, Niche A:c, and the Alley A:i. Only five were found in the house, more exactly in Nylander's stratum 5 (= Pohl's stratum 7/6). But since many of the finds "had probably been thrown down from the higher *Spina* area",[136] it remains uncertain if the house had a tiled roof from the very beginning (late VII century BC). Still, it seems a reasonable conjecture—it would tally with the conclusions from Area F East and with the painted revetment plaque (see above, *Section 4*, *No. 8*) from the *Spina*, dated certainly before 575, but presumably no later than *c*. 600 BC.

Pohl's division of the Borgo tiles into her three building periods[137] cannot unreservedly be used as a chronological basis. The strata are often mixed, earth fills have been added, and fragments have continuously been tumbling down from the upper plateau.[138] The only roof-tiles that can be dated approximately by external evidence are the five fragments of Type III ridge-tiles (*Fig. 6*)—almost certainly belonging to House A—whose best parallels have been dated between 560 and 520 BC.[139] In other words, if House A was tiled from the beginning, we may suspect that the roof was replaced by a new one two or three generations later. The explanation could be the conflagration demonstrated by eight secondary fired tile fragments from House A and its immediate surroundings.[140] A connection between the fire and the earthquake in 550/530 BC can at least be suspected: "The A-area was remodelled on a higher level and new and quite different constructions were built." On the other hand, Karlsson in his summary states that "nothing can be traced of any rebuilding of House A after the earthquake (except wall A2)".[141] I would suggest that the Type III ridge-tiles constitute such traces.

My earlier hesitation to use the three stratigraphically established periods of Pohl as a basis for dating the roof-tiles was caused primarily by the high percentage of dark clays and red paint in period III. But in the light of observations from the V-century BC House 3 at the Pietrisco Bridge (below), this argument is no longer conclusive. The few diagnostic roof-tiles that can be connected with particular building periods do, in fact, fit fairly well into the pattern. A position in the second and third periods for the secondary fired fragments and in the third for the Type III ridge-tiles is in accordance with the development sketched above. The distribution of cover-tile types adds nothing (all three are in evidence already in the VI century BC), and the Type I pan-tiles in period III no longer give reason to doubts.

A further piece of evidence for tiled roofs before *c*. 575 BC is perhaps provided by a ridge-tile fragment from Tomb 13 in the Porzarago Necropolis, dated to 650/575 BC. Moreover, Pohl suggests a date towards the end of the VII century BC for the tiles from floor 2 in Area E ,[142] but the find circumstances are not unambiguous.

The gradual transition to tiles with lighter clays from the late VI century BC onwards involves particular problems. I once stated that, whereas 77% of the Borgo fragments were made of the Archaic darker clays, 14% belong to the later, lighter clays. But Pohl maintains that "There are none [with lighter clay] on the Borgo, where the latest ceramic material came down to about 430/410 BC".[143] Obviously, our definitions of "lighter clay" differ (see above, p. 133), but it speaks (somewhat) in Pohl's favour that not a single fragment of Type II pan-tile has been reported from the Borgo. Pohl may well be correct in her conclusion: "It is possible, but not confirmed, that yellow tiles started in use at San Giovenale in the late V century BC. Definitely confirmed, however, they occur for the first time [...] in contexts of the IV and III centuries BC."[144] But we may both be right, if improved firing conditions (or possibly different clays) produced light brown of beige/buff tiles in the late VI and V centuries BC and greenish yellow-cream, pink-buff etc. in the IV.

Pohl gets further support from the finds at the Pietrisco Bridge. Apart from roof-tiles from all three building phases,

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[136] *San Giovenale* V:1, 96.

[137] I. Pohl's period I (*San Giovenale* V:2), *c*. 625–550 BC, corresponds to C. Nylander's periods 1 and 2 (*San Giovenale* V:1), her periods II (530–500 BC) and III (500–410 BC) to Nylander's period 3.

[138] *San Giovenale* V:1, 50; V:2, 19–23; Ö. Wikander in *San Giovenale* V:I, 180f.

[139] Ö. Wikander in *San Giovenale* V:1, 179, 181; Ö. Wikander 2017, 82, 88 nos K 40, 46. The chronological scope that I suggested earlier, 575/475 BC (Ö. Wikander 2017, 67), was probably unnecessarily wide.

[140] Ö. Wikander 1981, nos 30f.?, 38 (cover-tiles), 40?, 45 (ridge-tiles), 59f. (skylight-tiles) = *San Giovenale* V:2, nos A:b-3-7-71, A:d-2-4-709, A:d-2-4-727, L-1-20, R-517, R-522f. They have been assigned to different periods: Ö. Wikander 1981, nos 40 (periods I–II), 30, 59f. (period II), 31, 45 (period III). Fires must have occurred quite often in spite of the protective tile-roof, and I have found evidence of one more, perhaps datable in the VII century BC, as a pan-tile fragment, "completely misfired with grey and cracked surfaces", was found in the West Area: *San Giovenale* V:2, 187 no. WA-1733.

[141] *San Giovenale* V:1, 142 (C. Nylander), 153 (L. Karlsson). Cf. *San Giovenale* V:2, 20f. (I. Pohl).

[142] *San Giovenale* III:3, 102

[143] *San Giovenale* II:5, 50; Ö. Wikander in *San Giovenale* V:1, 179. One of the Type III ridge-tile fragments (late VI century BC?) has what I denote a light (beige) clay.

[144] *San Giovenale* II:5, 50. I, thus, withdraw my sceptical comment in Ö. Wikander 2017, 142 n. 128. If the conclusion is correct, it obviously falsifies my argument in Ö. Wikander 2017, 142 item 11a.

an abundance of tiles from the end of the pre-construction phase proves that there were one or more houses with tiled roofs even before *c*. 565 BC.[145] But the third building phase (House 3) entails further problems, as Backe-Forsberg suggests that the roof might possibly have been thatched. The reason she refers to is, however, of little consequence. The lack of "wedged" tiles does not necessarily mean that the apsidal building could not have had a tiled roof.[146] The really interesting phenomenon is that all roof-tiles from this building phase (480/470–400 BC) are made of the dark, "Archaic" clay and include pan-tiles of Type I, but not a single fragment of Type II.[147] If the entire roof was not laid with reused tiles, this would mean that at least some San Giovenale tile workshops continued to produce "Archaic" tiles, totally disconnected from the developments in other parts of South Etruria. Recently, Backe-Forsberg and Holmgren suggested that the third building phase may date much later, in Roman or Byzantine times. They propose that the apsidal building could have been a Byzantine road chapel.[148] If the redating is correct, the Archaizing roof-tiles would, in fact, be mediaeval—a date even more difficult to accept.

Unique information is afforded by House XI in Area F. Erected about 400 BC and used, according to the pottery finds, during the IV and III centuries BC, it is our only unmistakable example of a post-Archaic house and its roof. Unfortunately, only four tile fragments have been published, selected by me in 1979, when I was totally unaware of the importance of the material. Two lower corners of Type II pan-tiles are elegantly shaped and well fired with *light* brown clay—examples of the light post-Archaic terracottas, but with traces of the "Archaic", dark red paint. Of the two ridge-tile fragments, one is provided with the "Archaic" plastic cordon, but the clay is light brown. In contrast, the other—presumably of the same type—is fired reddish-brown throughout. Apparently, we here encounter a roof in a transitional phase, displaying both older traits and those pointing forwards.

After the end of the Etruscan settlement towards 200 BC, the area was perhaps occupied by Roman settlers. In any case, during the first three centuries AD, two important Roman villas were established in the neighbourhood, one north-east of the Acropolis, (Casale Vignale), the other south-west of it, on Montevangone (Quarto della Cammerata).[149] This, apparently, is the period which produced the stamped Roman bricks from Vignale and the Chapel on the Acropolis.

6. General conclusions

The geographical position of San Giovenale is fairly isolated, on the spurs of the Tolfa Mountains (*Fig. 20*). Nonetheless, it was often in close contact with cultural developments in the surrounding territory. Admittedly, East Greek imports are almost totally lacking, true red impasto and white-on-red quite rare, but Caeretan influence is obvious from the late VII century BC onwards and, at least from the mid-VI century BC, Attic pottery and widespread literacy show that the consequences of the isolation should not be overrated.[150] Even deeper into the Tolfa Mountains, the Riserva del Ferrone has yielded Caere-inspired rock-cut tombs, closely reminiscent of those at San Giovenale, some of them dated as early as *c*. 650 BC.[151]

At San Giovenale, the urbanization with stone-built, tile-roofed houses, presumably inspired from Caere, goes back to the VII century BC. It may well be that Building I and House IV in Area B, the first House I in Area F East, and

[145] Backe-Forsberg 2005, 52, 88, fig. 35 (pre-construction phase 3, 675–565 BC), 53 (House 1, 565–550/530 BC), 56 (House 2, 550/530–480/470 BC), 57 (House 3, 480/470–400 BC).

[146] Wedged (trapezoid) tiles were used from the IV century BC onwards on circular and apsidal buildings (Ö. Wikander 1988, 216, fig. 7e), but even without them various solutions were at hand. For one conceivable solution, see Brodribb 1987, frontispiece. At Ficana, roof-tiles were found at an apsidal house, dated to *c*. 600 BC (Melis & Rathje 1984, 393f.). A. Rathje (2001–2003, 64) even claims that "tiles can also be used for roofing round houses", but in that case I am more sceptical (Ö. Wikander 2017, 146 item d).

[147] Backe-Forsberg 2005, 57, 92. Dark clays are rare after the VI century BC, but the conditions at San Giovenale are not unique. Such tiles have been reported from Pisa in the V/IV century BC and Artena in the IV/III century BC (Ö. Wikander 2017, 143).

[148] *San Giovenale* VI:2–3, 255, 293, fig. 221.

[149] Hemphill 1993, 49–52, fig. 5. But both have a history going back to the IV or III century BC: Hemphill 2000, 45f. no. 66, 85f. no. 134.

[150] As pointed out by C. Nylander, in *San Giovenale* V:1, 29. For the Etruscan road system around San Giovenale, see Wetter 1962; and the summarizing discussions in Gierow 1986, 27, fig. 1; Backe-Forsberg 2005, 110–114; *San Giovenale* VI:2–3, 59–61, fig. 30; and Olsson 2021, 79–85, fig. 17. But I. Pohl's comment in *San Giovenale* III:3, 101 n. 72, is obviously not unjustified: "San Giovenale certainly was, and still is today, an extremely isolated place, difficult to approach and far away from important roads of communication. A modern example of the geographic, social, economic and cultural isolation, which the rather impervious nature of this hill country enforces on its inhabitants, is the near-by miserable village of Civitella Cesi, which has almost no communication with the outside modern world, and still lives according to almost Mediaeval and feudal patterns." On the other hand, 20 years later, Pohl herself described San Giovenale as "a flourishing place at a crossroad, thoroughfare for wares and cultural impulses from all parts" (*San Giovenale* V:2, 225).

[151] Brocato 2000, particularly 364–369, Tomb 33. Cf. Tobin 2015, 30–33, 85, table 2.

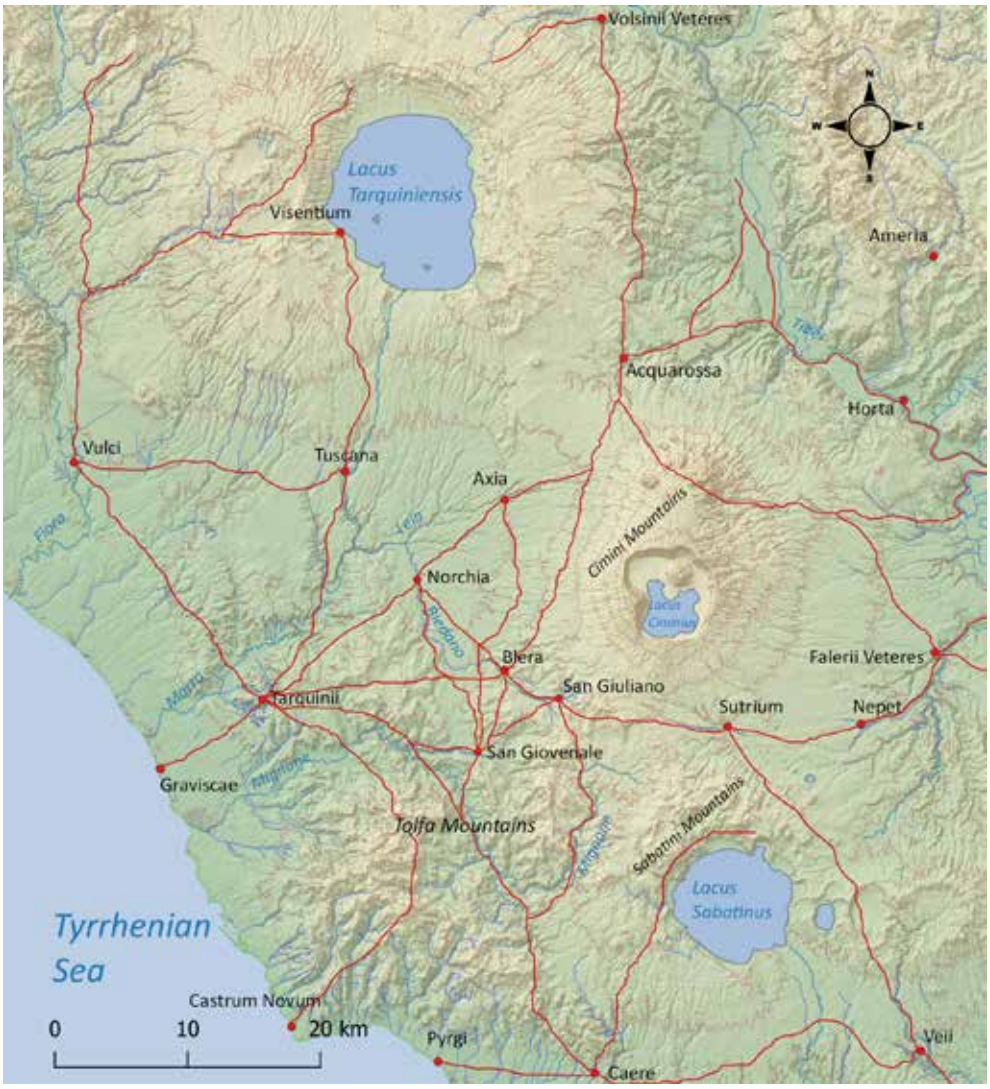

Fig. 20. Etruscan roads in South Etruria (= Olsson 2021, fig. 17).

House F in the Borgo (dated 650/625 BC) were not tiled,[152] but evidence from the Borgo and Area F East indicates that roof-tiles were introduced—if not *c.* 625 BC as often stated nowadays, at least not much later—by itinerant or immigrant craftsmen.[153] A great many sites in the neighbourhood have also yielded finds of Archaic roof-tiles. Three of these, within a radius of 3 km from San Giovenale, have been dated roughly by pottery to the VII century BC. If by coincidence or not,

[152] *San Giovenale* II:2, 15–17, fig. 6; II:4 (Area B); IV:1, 67–71, 146 (Area F East). Not only was Building I in Area B totally void of roof-tiles, but the greyish-black stratum 2 may well contain the burnt remains of its thatched roof. The situation concerning House F in the Borgo is less clear. A few tile fragments were found in low strata, but the stratigraphy is disturbed and consists of later fills. Moreover, the proposed foundation date (*c.* 650 BC or earlier) speaks clearly against the roof being tiled. See *San Giovenale* V:1, 131; V:2, 67, 69.

[153] "The road from Caere northwards to Acquarossa would most probably take in San Giovenale *en route*, a line of communication also evidenced in much of San Giovenale's pottery of the Archaic period" (Ch. Wikander 1988, 27; cf. *ibid*., 134, 136). For the importance of travelling artisans for the diffusion of Caeretan tomb architecture to San Giovenale, see Tobin 2015, 85f., 97f.: "a number of San Giovenale tombs are so similar to tombs at Cerveteri that they are likely to have been constructed by traveling workers who either trained at Cerveteri or trained with someone who had worked there." The same connection may be suggested concerning the early tile-workers. Other ways of spreading architectural terracottas are discussed by N. Winter (2017).

they are all located—close to each other—north-north-west of the Acropolis.[154]

If the conclusion that the tiled roof was not introduced at San Giovenale until after 625 BC is correct, it is remarkable that this may have happened later than at Acquarossa (640/620 BC), in spite of San Giovenale's location considerably closer to Caere. The difference in time may, of course, be illusory, but it could reflect the differences between the two sites: Acquarossa, a large and rapidly expanding centre, with well-established communications not only with Caere and the coast, but also with the Tiber valley and the Faliscan territory; San Giovenale small and isolated, with an insignificant population not great enough originally to sustain the specialist craftsmen needed to cut tufa ashlars and produce roof-tiles on the scale necessary for such a transformation of the society.[155]

The transition to stone-built houses with tiled roofs laid notable economic strain on the community, and it does not unmistakably constitute the progress it may appear to us.[156] Shapeless tufa blocks can be cut for individual buildings (such as Building I in Area B), but production of roof-tiles—including all the stages necessary in that process—would hardly be initiated without their being in fairly great demand. It is only natural that the transition was normally a rapid one, as soon as the decision had actually been made.[157]

I have repeatedly maintained that the most important reason for replacing thatched and wooden roofs with tiled ones was the swift urbanization—overcrowding, lack of building space and, thus, increased fire hazard.[158] Whereas a terracotta roof constitutes a certain protection from devastating fires, a burning, thatched roof scatters sparks over a wide area, perhaps an entire settlement. As far as San Giovenale is concerned, the excavations have shown that such conflagrations were, indeed, a frequent phenomenon in the Iron Age village[159]—thus, making the inhabitants prepared to make considerable sacrifices of time and effort in order to reduce the risk.

But if the erection of houses with tiled roofs began shortly after 625 BC, and the transition reached the unsuitable Borgo slope before 600 BC, the Acropolis must have become filled with houses over a quite short period, hardly more than the last quarter of the VII century BC. One must ask oneself what quantities of roof-tiles were necessary to obtain this result. In 1993, I published a rough estimation of the output of the Acquarossa workshops,[160] and the figures for San Giovenale presented here are even rougher. Their only purpose is to give a very general idea of the amounts.

Calculating with a building density similar to that of Acquarossa, we may reckon with about 130 houses on the Acropolis, and if each house had an area of 50–60 square metres, we would reach a demand of *very* approximately 40,000 pan-tiles, 35,000 cover-tiles and at least 1,000 ridge-tiles. This may have been enough to keep a tile workshop busy during the years of transition, but perhaps not more than one. It is, however, doubtful if future repairs and the new settlements in the Borgo and on Vignale could support the workshops, if they did not at the same time also produce dolia and other large vessels—something that many tile workshops certainly did.[161]

130 families (in the wider, Roman sense), perhaps between 500 and 1,000 individuals, may have been enough to produce the surplus necessary to sustain the specialist stonemasons, carpenters and terracotta workmen necessary for the profound architectural change. Population estimates as low as

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[154] Hemphill 2000, 38 no. 33, 39 no. 40, 42 no. 49, and the map, fig. 202.

[155] Cf. Brandt 2001, 410f. I. Pohl (1984, 92) reckoned with a substantial population growth towards the end of the Protovillanovan period, in the late VIII century BC. Many Italian scholars maintain that San Giovenale was deserted then but, if so, it becomes more difficult to understand the economic prerequisites for rapid urbanization after the mid-VII century BC. For the views predominating among the Swedish excavators, see particularly Pohl 1980. The recent discussions concerning "the concentration and centralisation of populations [...] as the stimuli for societal change" have been well summarized by P.M. Miller (2017, 22–30, with ample references).

[156] Ö. Wikander 1988, 206f. Cf. Miller 2017, 197–200. P.M. Miller (2017, xiv, 205–208) also cautions against taking the transition from huts to houses as a matter of course. He argues "that changes occurred in neither a synchronous nor a linear way, but separately and at irregular intervals", and states that they reflect "the relationship between human behaviour and the built and natural environments, rather than choices between old and new materials". Cf. Negroni Catacchio & Domanico 2001, 345–347.

[157] As suggested already by Drews 1981, 149–154. But other scholars prefer to see the transition from thatched to tiled roofs as "a long process". See, for instance, Miller 2017, 199.

[158] Ö. Wikander 1988, 207; 1990, 289; 1993, 161f.; 2017, 182. Cf. Miller 2017, 206f.

[159] *San Giovenale* II:2 (Area B), 12 (Test-Pit A, strata 3–4); 13 (Test-Pit B, strata 3–5), 15 (Test-Pit C, stratum 3?), 17f. (Test-Pits MN, stratum 2), 20 (Test-Pit F, stratum 4); III:3 (Area E), 33f. (strata IIIb–IV); IV:1 (Area F East), 46–48 (House I, strata 3B–4), 49, 51 (House II, stratum 4B), 52–55 (House III, strata 3B–4); Malcus 1984 (Area D West), 38f. Herodotos (V 101) gives a graphic description of the burning of Sardis in 499 BC, when the fire rapidly spread from one thatched roof to the other and destroyed the entire city (ἀπ' οἰκίης ἐπ' οἰκίαν ἰὸν τὸ πῦρ ἐπενέμετο τὸ ἄστυ πᾶν).

[160] Ö. Wikander 1993, 138f. (with slightly too high figures).

[161] Various decorations present on both pottery and terracotta support this theory, particularly white-on-red painting and the plastic cordons. See, for instance, Ch. Wikander 1988, 25, 131f.; Ö. Wikander 1993, 137.

c. 170 or 208[162] could not possibly be enough; "this kind of architecture [...] could not have evolved unless manpower was liberated from the basic subsistence activities and unless the necessary capital was available. It may therefore well be that the same pre-conditions, sedentariness, population pressure and social stratification were prerequisites for establishing specialisations in building techniques and that increased and sufficient demand created the basis for fulltime occupations."[163]

The earthquake, dated to 550/530 BC, allows us to form a clear opinion concerning the first period of local tile production. In most respects, the early San Giovenale roof-tiles accord closely to the contemporary output in neighbouring towns, as best known from Acquarossa. Type I A and I B pan-tiles, those with extremely high raised borders, and Types I, II, and III C cover-tiles agree in almost every detail with their counterparts there. Ridge-tiles of Types I and III have at least close parallels, and, just as at Acquarossa, the cordoned type is the most common.[164] Even the thickness of all three categories is more or less identical. We meet the same methods of forming the tiles, the same reddish-brown clay, the same dark red paint, and the same bevels under the pan-tiles. There are also pan-tiles with decorative painting (see above *Section 4*, *Nos 1–3*) and two types of revetment plaques, one identical with (*Section 4*, *No. 8*) and one closely related to (*Section 4*, *No. 9*) plaques at Acquarossa. The similarities are, of course, not at all surprising, as both towns presumably received the innovation from Caere.

But each workshop had its own characteristics, and we meet differences, too, compared to other production centres.[165] The San Giovenale tiles are unusually heavily tempered, particularly with local "white specks", but occasionally with small pebbles (Area E, Pietrisco Bridge). The underside of some pan-tiles and many ridge-tiles are smoothed, and the fabric is often better fired than at Acquarossa; dark grey to black cores are rare.[166] For that reason, it is surprising that many San Giovenale tiles have lost their surface layer. At least one pan-tile fragment clearly indicates that the damage had occurred when it rested on the roof rather than later.[167] Vitruvius comments on the issue when describing how to decide the quality of fired bricks: it should be "used on a roof and exposed to wind and weather during a lapse of time. If it is not made of good clay or is not baked enough, it proves defective when subjected to ice and hoar frost."[168] One skylight-tile (from the Borgo) has been formed in so odd a manner that we may see the consequence of the lack of contacts with the procedures of external workshops. But the early date of the skylight-tiles and the rare eaves-tile with tile-stop(?) speak to the opposite.[169] As for the laying of the tile-roof, it is interesting to note that the otherwise rather common chipping/trimming of lower pan-tile corners (in order to make overlapping more efficient) was apparently not affected.[170]

The most striking difference compared to Acquarossa is the rarity of decorative terracottas, discovered in abundance at the latter site. Seemingly, San Giovenale had no simas (?) or akroteria and no relief plaques except perhaps for the odd fragment from Area F East (*Section 4*, *No. 10*). But, considering that the decorations which do exist are known from only one or two fragments each, we have every reason to believe that more categories were at hand originally. The damage done to the buildings on the Acropolis was so far-reaching that some of them had been virtually obliterated.[171] Only Area F East

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[162] Backe-Forsberg 2005, 120. For various reasons, C. Nylander (1984, 65) reckons with "*una notevole popolazione a San Giovenale durante il periodo arcaico*".

[163] Brandt 2001, 411. Cf. Ch. Wikander 2001, 271f. S. Forsberg (1984, 75) interpreted the VI-century BC Pietrisco Bridge as a sign of "*la capacità sociale, economica e tecnica della comunità di San Giovenale nell'epoca arcaica*".

[164] Cf. Ö. Wikander 1993, 160, 162; 2017, 186f.

[165] Cf. I. Pohl's (1984, 93) comment on "*la tendenza dei ceramisti di San Giovenale di 'fare da se' anziché importare*".

[166] At Acquarossa, no less than 53% of the ordinary pan-tiles have a grey to black core, but only 17% of the thinner cover-tiles. For the thicker ridge-tiles, the figure is 93% (Ö. Wikander 1993, 118–121, fig. 48).

[167] Ö. Wikander 1981, fig. 3:12, with well-preserved slip and paint on and along the raised border. Cf. *ibid*., figs 3:20 (pan-tile Type I), 4:26 (pan-tile Type II), 10:42, 10:44 (ridge-tiles Type I).

[168] Vitr. II 8.19: *De ipsa autem testa* [...] *statim nemo potest iudicare, quod in tempestatibus et aetate in tecto cum 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.*

[169] Possibly earlier skylight-tiles have been found only at Satricum and Acquarossa. Probable tile-stops are known from only four other sites: Caere, Civita Castellana, Punta della Vipera and Poggio Civitate (Ö. Wikander 1993, 32 no. 23, 40, fig. 7; 2017, 42–44 nos T 112, 115, 147, 150f., 188), and none is dated earlier than 550/530 BC. In other words, if *Pozzo* 1 in Area F East did in fact contain the debris from the earthquake, the San Giovenale specimen may be the earliest one known.

[170] We may have one example, if the phrase "the lower back corner was chipped off" (*San Giovenale* V:2, 61 no. A:g-3-3, pl. 107) refers to deliberate chipping. For the procedure in general, see Ö. Wikander 1993, 125; 2017, 150, 164. At Acquarossa, a great number of almost complete pan-tiles lack one corner, presumably smashed when the tiles hit the ground. Accordingly, if the damage is less extensive, a missing underside of a corner may well be accidental rather than deliberate.

[171] Pohl 1985, 59f. We have, thus, no reason to exclude the existence of temples or other public buildings at the site, nor to question San Giovenale's quality as a true town—as does Pohl 1984, 93 (cf. Backe-Forsberg 2005, 121f.): "*ci si aspetterebbe di trovare* [...] *almeno un frammento di terracotta architettonica. E invece non c'era*".

preserved such a number of roof-tiles that the rarity of decorative terracottas there may be considered significant. Anyhow, in spite of the painted revetment plaque *No. 8* (and *No. 9*?), it seems out of the question that most houses were decorated with such plaques as at Acquarossa.

While Acquarossa was abandoned in 550/530 BC (presumably because of the contemporary earthquake), the inhabitants of San Giovenale rebuilt their damaged houses. Nylander speaks about a "minor earthquake [...] with a distant epicentre" but, if the theory is correct, the disaster was rather a major one. In the Borgo, "House C and the nearby Lane K were suddenly filled in with a huge, approximately 1 m thick fill, consisting of earth, rubble, broken tiles and pottery." Areas A and R and Courtyards Bc and Cc were raised to a higher level, "and new and quite different constructions were built".[172] No obvious tile falls have been reported, but the well-preserved pan-tiles in Room Cb and the secondary fired tile fragments from the area of House A indicate that the destruction was so complete that few (if any) roof-tiles could be reused on the new buildings.[173]

At the Pietrisco Bridge, "[t]he debris from the preceding house was carefully swept away and probably put in a dump for earlier refuse located quite near the bridge, as the result of the spatial and stratified analyses of the tiles and pottery shows".[174] As in the Borgo, the rebuilding of the area included substantial changes, whereas in Area F East all three buildings were reconstructed on the same grounds.

In Area F East, the earthquake may be reflected in the number of fallen roof-tiles: "The destruction layer in question is stratum 2B [...] Inside Room B of House II, there was what looked like a tile fall to the excavators [...] Also some areas in Court D were filled with roof tiles, that looked like tile falls [...] House I has not furnished clear evidence for a violent destruction, though stratum 2B is also filled with large amounts of fallen roof tile and tufa blocks."[175] But the reported quantities of tile fragments give another picture (*Table 3*).

Table 3. Number of roof-tiles found in Area F East. Post-Archaic lighter tiles are not included.

Stratum	House I	House II	House III B	III A + Court D	Total
1	27	289	138	449	**903**
2A	18	184	13	507	**709**
2B	15	56	-	199	**270**
3A	30	6	2	115	**153**
3B	-	-	-	22	**22**

The tile fragments from stratum 2B are, thus, much fewer than those from stratum 2A. But: "Many of the tiles and blocks [...] seem to have been left *in situ*, while the surface was levelled for the reconstruction of the house."[176] If the levelled tiles were used as a floor in the later building, they may well have been registered among the finds from stratum 2A. If so, the figures undoubtedly support the theory concerning earthquake destruction in Area F East, too.

Moreover, *Pozzo* 1 apparently contained roof-tiles fallen (from House I) during the earthquake. The same could be true concerning the great number of tiles found in the upper parts of wells on the *Spina* above Borgo NW. But otherwise, the contents of the wells in Area F East and the Borgo are not documented in a way that allows of any such conclusions to be drawn. On Vignale, too, there are extensive traces of destruction by the earthquake: "most of the water installations [...] were filled with post-earthquake building debris", building activities were restricted to the westernmost part of the plateau, and the area was gradually given over to agricultural occupations.[177]

Roof-tiles from the period between the earthquake and *c.* 400 BC are stratigraphically discernible in the Borgo and at the Pietrisco Bridge, whereas those from Area F East cannot be separated from later ones (up to *c.* 275 BC). In the Borgo, a new kind of ridge-tile (Type III) was applied, and the alleged antefix (*Section 4*, *No. 5*) must be more or less contemporary (but originating from the plateau above). Otherwise, we encounter the same plain tiles as before the earthquake. Particularly noteworthy are the dark clay and the persistent use of Type I pan-tiles—already replaced by Type II elsewhere. This may partly be caused by reuse of undamaged Archaic tiles, but hardly entirely so. If this impression is correct, it could be an indication that the San Giovenale tile-workers had lost their contacts with external developments.[178]

For a long time, it was a general opinion that the settlement at San Giovenale came to an end in the very beginning

This, of course, is simply not true; see *Section 4*. It has been suggested that a monumental building was once located below the mediaeval Castle, but perhaps a better proposal is C. Nylander's suggestion "to conjecture the existence of a building of some importance (a temple?)" on the *Spina* above Borgo NW, the probable origin of some decorative terracottas (*Section 4*, *Nos 5*?, *8f.*, *12*?)—at the main entrance to San Giovenale (*San Giovenale* V:1, 34). Cf. *San Giovenale* VI:2–3, 244f., 254f., fig. 118 (caption). For a possible sanctuary in the westernmost part of Vignale, see *ibid*., 179.

[172] *San Giovenale* V:1, 141f.

[173] *Pace* I. Pohl: "most tiles [of her building period I] were obviously reused in the second building period" (*San Giovenale* V:2, 20).

[174] Backe-Forsberg 2005, 90.

[175] *San Giovenale* IV:1, 162, fig. 37.

[176] *San Giovenale* IV:1, 163, House I, stratum 2A.

[177] *San Giovenale* VI:2–3, 261–263.

[178] If correctly dated to I. Pohl's period III, the clumsily manufactured ridge-tile Type IV may be taken as an additional sign of the isolation of San Giovenale's tile-workers during this period.

of the V century BC—as is still evident from the discussions at the *San Giovenale. Materiali e problemi* symposium in 1983.[179] Pohl raised vigorous objections at the symposium and returned with more detailed (and utterly convincing) arguments two years later.[180] Not only could she prove the survival of the town throughout the V century BC, but she also presented evidence for people living there up to at least *c*. 200 BC. In this respect, San Giovenale does not differ markedly from general developments in the Biedano region. The V and, particularly, the IV century BC involved important demographic changes but, whereas small farmsteads decreased noticeably in number, towns and villages survived.[181] To what extent the survival of San Giovenale can be connected with the increasing power of Tarquinia and with its position as a possible frontier stronghold between that city and Caere is impossible to say.[182]

Seemingly, the Borgo and, at least to some extent, the Pietrisco Bridge[183] were abandoned about 400 BC, and the settlement was restricted to the Acropolis and the western tip of Vignale. Some earlier buildings there were still occupied and, most revealing, at least one entirely new house was erected, House XI in Area F.[184] This is quite in accordance with the find of two Type II pan-tile corners in that house—interestingly, together with a ridge-tile still of the cordoned Type I.[185] The multitude of white specks in the clay shows that the pan-tiles were still manufactured at San Giovenale. Similar late Type II pan-tiles have been found in Areas C and F East and on the Vignale.[186]

This is obviously the period of the greenish, pink and cream-coloured tile-clays encountered in Areas B, F East and Vignale. But except for a few lower corners of Type II pan-tiles, the publications have little to say about these late tiles, apart from the colour of their clay. But the statistics supplied by the publication of Area F East (*Table 1*, above, p. 120) gives us one interesting piece of information: they were never common. Together (excluding *Pozzo* 1), the three houses yielded 34 tile fragments of light clays vs 2,070 of dark ones—that is, no more than 1.6% of the entire bulk. In other words: no house in the area was ever covered with these tiles. They can only have been used to repair damage to earlier, "dark-clayed", roofs. But it is also worthy of note that the great majority (27 fragments) of "light-clayed" tiles come from House I, where they constitute as much as 23% of the bulk. It may well be that House I alone was repaired with these late tiles, while the seven scattered fragments found in Houses II and III were secondary intrusions rather than examples of occasional repairs.

About 200 BC, even the Acropolis was finally abandoned, and Pohl suggests that the ruins of the buildings were deliberately destroyed, either very soon to make room for planting of vines and olive groves (as earlier on Vignale) or much later to be reused as building materials. As early as the IV or III century BC, two major *villae rusticae* were established less than 1 km from San Giovenale, and not only the Roman tiles from Casale Vignale but also those of the *tombe alla cappuccina* below the mediaeval Chapel and in an Archaic tomb in the Porzarago Necropolis can perhaps be connected with them. But, if locally produced, the tiles can hardly come from a workshop at San Giovenale itself.

The suggestion that Roman roof-tiles were produced at a *villa rustica* 4 km north-west of San Giovenale (Villa Selvasecca) is based on the remarkable assumption that they were manufactured in tufa moulds[187]—a procedure to my knowledge never applied in the history of roof-tile production. The

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[179] Forsberg & Thomasson 1984, 66, 68 (C. Nylander), 104 (G. Colonna), 106 (M. Cristofani).

[180] Pohl 1984, 92f., 95f.; 1985. But similar thoughts were already presented by K. Hanell (1962, 308, 310), and A. Boëthius wrote, eight years later: "*intorno al 400, la città si ridusse alla parte più alta e più facilmente difesa, nel centro della acropoli*" (Boëthius 1970, 163). For Hellenistic tombs, see Tobin 2015, 74 with n. 366, table 16.

[181] Olsson 2021, 104–106, figs 22–24, table 2. It may be significant that not one of the *gentilicia* known from the Biedano region in the Archaic period is attested there during the IV–II centuries BC (*ibid*., 171, tables 8f.).

[182] See Colivicchi 2020, 110–112, fig. 2, who attributes most of the northern strongholds to Tarquinia.

[183] Whereas I. Pohl (1985, 55) thought that Vignale was deserted already in the mid-V century BC, Y. Backe-Forsberg (2005, 120f.) found so early an abandonment "debatable" and suggested, instead, the IV century BC. Backe-Forsberg and R. Holmgren have now shown that the building activity on Vignale reached its peak in the VI century BC and declined in the V century BC. To a limited extent, however, the settlement on the western end of the plateau seems to have survived into Roman times (*San Giovenale* VI:2–3, 265–268). The IV- and III-century BC pottery from the Pietrisco Bridge was "mostly found at the southern side in stratum 1" (*ibid*., 59).

[184] The publication of another late building (House V in Area F) was under preparation by Daniel Fuglesang, but was interrupted by his untimely death.

[185] This may imply that Type I ridge-tiles, which I earlier dated to 650/550 BC (Ö. Wikander 1993, 67 no. K 28; 2017, fig. 33 no. K 28) were still in use at least as late as *c*. 400 BC.

[186] My earlier attempts to date the pan-tiles from House XI to 650/475 BC (Ö. Wikander 1981, 76; 1993, 35, 38 no. T 78) or the VI century BC (Ö. Wikander 2017, 40, 50 no. T 78) were apparently misguided. The late appearance of Type II at San Giovenale may be additional reason to doubt the alleged V-century BC date of such pan-tiles from Luni sul Mignone—5 km west of San Giovenale and even more isolated. See Östenberg 1969, 93, 103, fig. 4; Ö. Wikander 1993, 32 no. T 43, fig. 7; Bengtsson 2001, 31, 37.

[187] "*... un blocco squadrato di tufo fornito di tre incavi stuccati probabilmente usati come matrici per la manifattura di tegole e di embrici*"

tiles could hardly have been removed from the moulds until they had dried. Allan Klynne, in his revealing revision of the Villa Selvasecca excavation, questions the interpretation of "The enigmatic feature encountered in room 17" as a "trough for tiles" and finds it "utterly unlikely that *imbrices* should have been manufactured one by one in a concave mould". He also points out that "No detailed drawing or close-up photograph of the trough [...] exists".[188]

Considering the obvious difficulties of transporting great numbers of heavy roof-tiles by land, it is yet tempting to reckon with, if not local, at least regional production. Cato the Elder, who had a *villa rustica* in the vicinity of Venafrum, wisely recommended that tiles should be bought in that very town.[189] But land transport of heavy goods was in no way excluded. Cato bought an oil-mill (*trapetum*) at Suessa and paid a substantial sum (including daily wages for six men over six days) to get it to his farm (*c.* 30 km as the crow flies). As roof-tiles were quite expensive, the purchaser was probably also prepared to pay for the necessary transport.[190] Or, perhaps the Mignone and the Vesca were navigable up to San Giovenale during winter and spring?[191]

After a long interruption, finds of pottery indicate that parts of the Acropolis were inhabited again at least from the VII century AD onwards.[192] Mediaeval tiles have been reported from three test-pits in Area B but, without further information, it is impossible to say if they derive from domestic buildings, from the XIII-century Chapel or from its forerunner.

The degree of isolation of San Giovenale has certainly changed markedly over time, and it is perhaps reflected in the development of the local tile industry. The relatively late introduction of roof-tiles may be an indication of the absence of market potential for the first groups of tile workers, when looking for employment in Caere's hinterland. The inability (or reluctance) of their V-century BC San Giovenale successors to keep pace with the revolutionary changes that were taking place in their trade grant them a unique position of backwardness in technical matters—whereas, during the earlier VI-century BC interval, they had apparently been completely up-to-date with the South Etruscan tile production in general. However, the limited number of roof-terracottas found and published from San Giovenale does not, unfortunately, allow any certain conclusions to be drawn, and I present this sketch of the historical development as nothing more than a working hypothesis.

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(Andrén 1971, 14, pl. XXXV:76). Cf. Berggren & Andrén 1969, 55f., 70, fig. 3; Berggren 1976, 95–97; Klynne 2006–2007, fig. 8.)

188 Klynne 2006–2007, 52f. with n. 138.

189 This, of course, does not mean that Venafrum was the centre of Central Italic tile industry in general, as maintained by Blake 1947, 286.

190 Cato settled the price for a pan-tile to one sestertius (*Agr*. 14.3; from Venafrum 135.1) and the daily wages for unskilled labour to less than two (*Agr*. 22.3). Half a day's work for a single tile may seem exceedingly expensive, but it agrees well with the price quotations from a number of Hellenistic Greek inscriptions (Ö. Wikander 1988, 206f. with n. 34). Information on the freight of the *trapetum* is to be found in *Agr*. 22.3.

191 "The Vesca is a perennial river carrying some water even in dry, summer months [...] During the rainy season it can become a formidable torrent" (S. Judson in *San Giovenale* V:1, 40).

192 Berggren 1984, 83f.; J. Hjohlman in *San Giovenale* IV:1, 173f. *Contra*: D. Whitehouse, in Forsberg & Thomasson 1984, 108.

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