



*Lincoln Cathedral from the castle walls. The west end.*

**Machicolation: Some postscripts**

*John Harris*

Since I wrote the piece “Machicolation: History and Significance”<sup>1</sup> I have come across some examples of machicolation which, though they may not alter any of the arguments discussed in that piece, do add interesting detail. The first example comes from the earliest days of castle building and touches on the invention of machicolation.

It has long been known that up in the intrados of the two flanking arches of the three on the west front of **Lincoln Cathedral**, there are slots that look very like slot machicolation, but there has been surprisingly little comment on them. These slots are accessed from small chambers at second floor level, which reinforces the idea that they could serve as machicolation; it is assumed that there was a similar slot over centre portal, which is of course higher than the others and has been altered; access to this could have been from a wall-walk at parapet level.

In 1986, an article by Richard Gem<sup>2</sup> was published which suggested that originally the west end of the cathedral was indeed fortified. This first phase of the work was begun by Bishop Remigius in 1072 and consecrated in 1092. It may seem surprising that a cathedral should be fortified, especially when it is so close to a royal castle of much the same date, but such a theory does explain these slots, for which it is difficult to find any convincing explanation other than machicolation. Other aspects of the building, in particular what must be a latrine, suggest a non-ecclesiastical purpose.

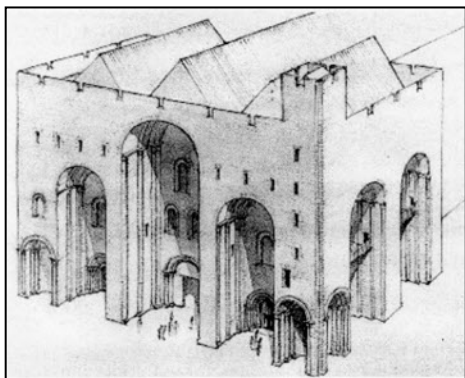
In an article published in 1997, David Stocker and Alan Vince<sup>3</sup> take up Gem’s idea and put it into the context of the evolution of the Roman town into the mediaeval Upper City of Lincoln. They argue convincingly that for a time the building that is now the west end of the cathedral

served as the keep of a castle built by Bishop Remigius in his rôle as temporal lord. When Bishop Alexander moved the military base of the bishop’s secular responsibilities to Newark in the second quarter of the 12th century, the keep was incorporated into a cathedral nave, which was then rebuilt after a fire in the 1140s. They also make a convincing case for the tower being completed near the start of Remigius’s building programme, perhaps by 1075, so this machicolation (and indeed the keep itself) is very early.

Much of the argument about whether this is some kind fortified west-work to a cathedral or a separate bishop’s keep lies outside the scope of this piece.<sup>4</sup> Few writers seem to regard the machicolation as remarkable in itself, apart from its importance in suggesting the defensible nature of the building, but I think it is and it seems clear that the idea of slot machicolation existed in England nearly a century before we find it in a more developed form at, say, Krak des Chevaliers, and this seems worthy of comment. It has been suggested<sup>5</sup> that one possible origin of slot machicolation is the double gateways formed of two separated planes found in Moorish Spain as early as the mid-10th century.

Here in Lincoln we have machicolation used in association with gateways; it seems a simple connection. But Bishop Remigius was a Norman; he had held posts in Fécamp and Dorchester but seems to have had no connection with Moorish Spain, or with what is now Iraq, where slot machicolation can be found dating from the late 8th century. But might his designer have been more cosmopolitan than he was? It would be exciting to find that the bishop had someone in his retinue with experience of military architecture in Spain.

Stocker and Vince draw parallels between this Lincoln tower and the White Tower in London as examples of the earliest phase of Norman hall-keep building in

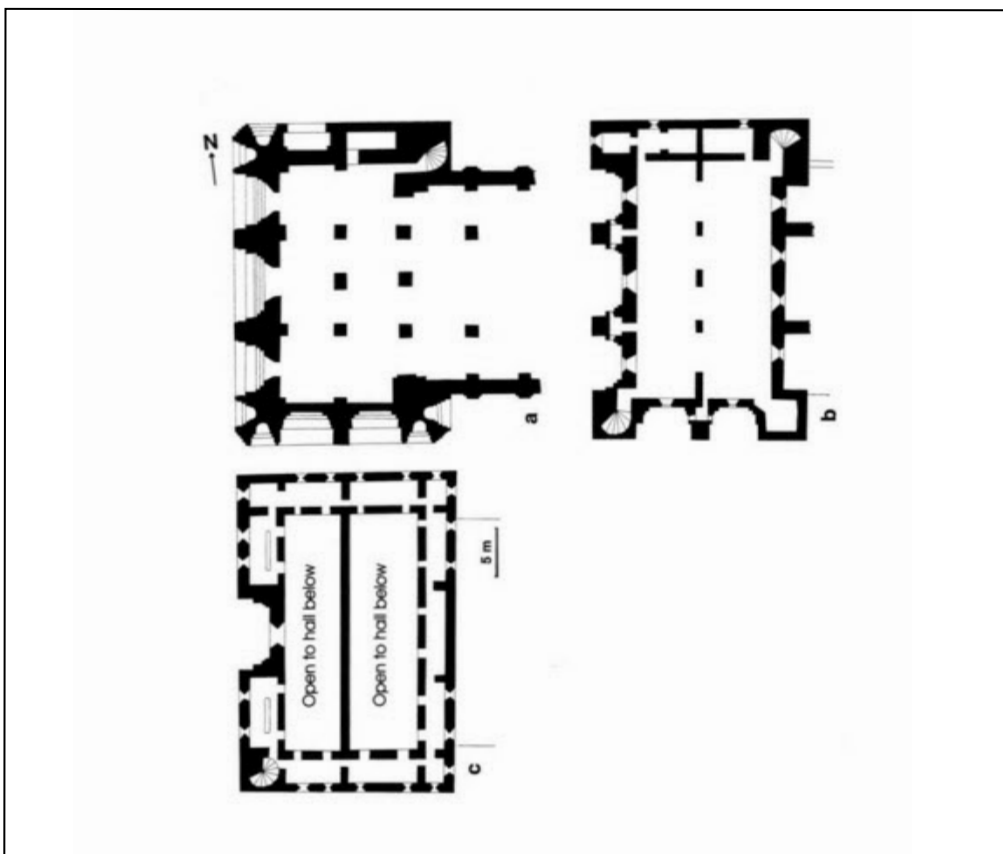


*Fig. 1. Top: Illustration by W. T Ball to Richard Gem's article (Architectural History 44: 2001).*



*Fig. 2. Right: View of flanking portal of Lincoln Cathedral, looking upward to show machicolation. Photo: John Harris*

*Fig. 3. Below: Hypothetical reconstruction of original plans of west front of Lincoln cathedral (Architectural History 44: 2001)*



England.<sup>6</sup> The Lincoln “keep” was some 34m by 19m; the White Tower is 36m by 31m. They publish floor plans of a hypothetical reconstruction based on Gem’s work<sup>7</sup>. Lincoln differs of course in having a relatively undefended narthex-like ground-floor space (or undercroft) with three doorways to the west, doorways which may have given access to the cathedral or some pre-existing church<sup>8</sup> but also served to add modelling to the building as arcading does at Norwich and the White Tower, but more dramatically and splendidly. The original arrangements to the east, abutting the church are unknown. It is tempting to wonder whether the vulnerability of these doorways prompted the thinking that led to including the machicolation. The slots could have been used to pour water on to fires lit against timber doors that were larger and more accessible than those of a typical keep, as well as to shoot or drop missiles on to besiegers.

The only mention of anything like machicolation in classical writing (Vegetius in the late 4th century) recommends slots as a way of dousing such fires rather than as a way of attacking besiegers. It is speculation, but as a cleric Remegius would have had access to classical works and just possibly could have read Vegetius, especially as he was a bishop with military responsibilities. Although the actual form of these slots is different from the type apparently envisaged by Vegetius, Remegius’s adoption of his suggestion might be an introduction of machicolation unconnected with its evolution in the east and in Spain.

As Stocker and Vince say “...Remegius was behaving not as a bishop, but primarily as a conventional great Norman Lord...symbolising his Lordship in the conventional Norman way by constructing a massive, dominant ....donjon .....” In doing so, he appears to have created a building form with special needs

and to have introduced or invented the device of machicolation to answer these needs.

At the other end of the mediaeval timescale, there are late-ish examples of machicolation that are worth examining for the light they can throw on the use of the device in the final years before its phasing-out. Each example is worth knowing about in itself.

**Soncino castle**, the Rocca Sforzesca, near Milan was built in about 1473 (Figs. 4, 5). It has rectangular towers and a continuous run of machicolation along the walls all in a style similar to many north Italian castles of the period, but it also has a single round angle tower with two layers of machicolation, one higher than the general run of wall-top machicolation and one lower. This tower is higher than the walls and in proportion unlike the *torrioni* of a *rocca* such as that at Imola which is of a very similar date. There the towers have been reduced to the height of the walls in response to attack by cannon. We must assume that the Soncino tower was built with an awareness of the potential of gunpowder artillery, in both defence and attack, although it may represent an on-the-hoof change to the design<sup>9</sup>. While there seems to be a wish here to demonstrate established authority by a continued use of machicolation and other mediaeval architectural forms in the castle overall, in the use of a circular tower, more resistant to cannon fire than the rectangular form that had been common in North Italy, and in the use of batter at the base of the towers and walls, there is a recognition of the need for change. The round tower is to all intents and purposes a *torrione*, despite its proportions and its height, although one that places importance on machicolation.

This strange arrangement of doubled-up machicolation might be used to support almost any theory about the purpose of machicolation: an enthusiasm for



*Fig 4. General view of Soncino castle. (Rocca Sforzesca), built in 1473 for Galeazzo Maria Sforza.*



*Fig 5 Double-machicolated round tower at Soncino castle. View from the south.*



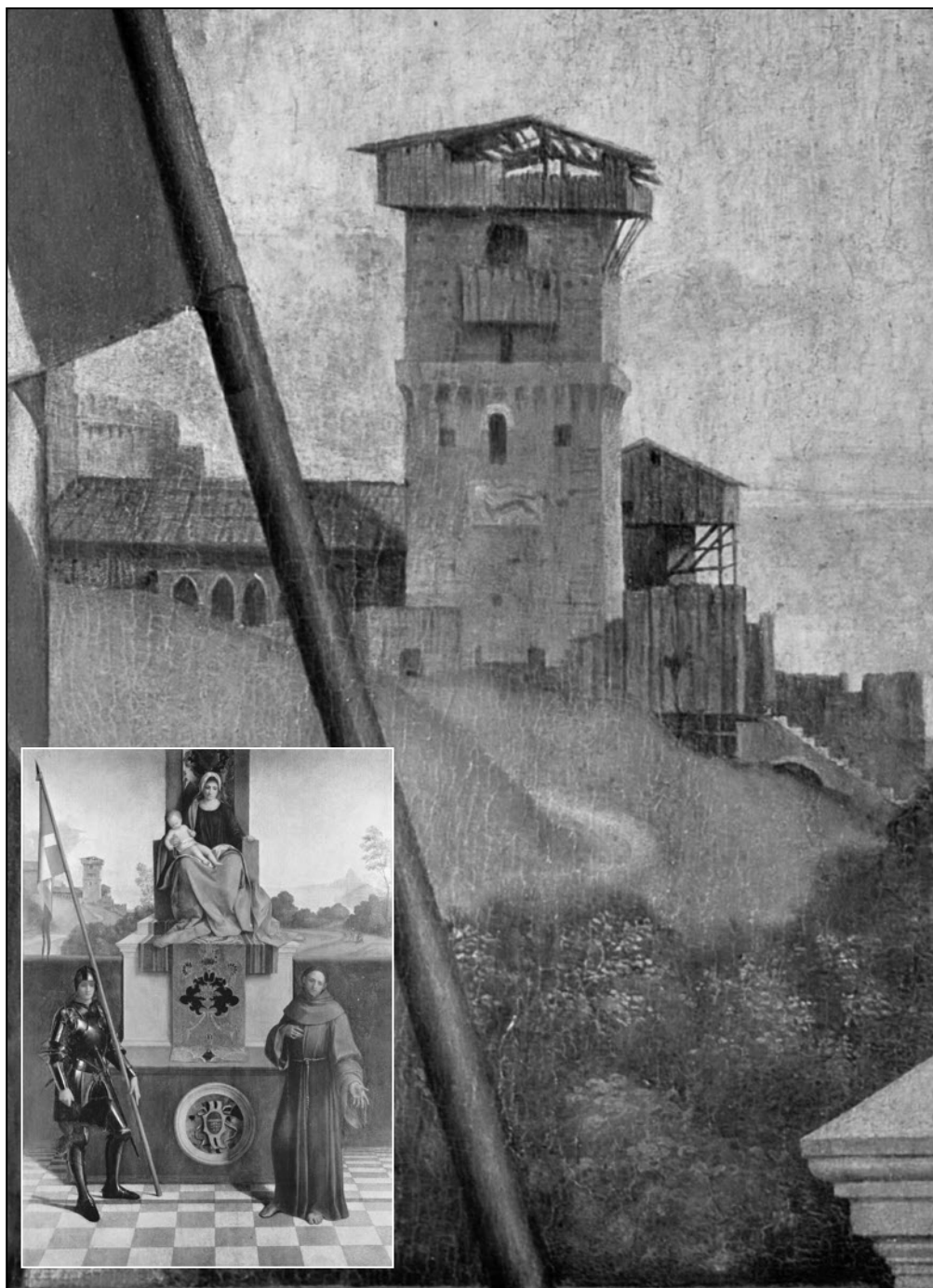
Fig 6 Typical Venetian chimneys of the 15<sup>th</sup> century. Depicted from the *Healing of the Madman* (detail), from the *Miracles of the True Cross Series*, 1494; tempera on canvas, 365 x 389 cm Gallerie dell'Accademia, Venice. Vittore Carpaccio (c.1460 - 1525/1526).

dropping missiles vertically, with here an attempt to double the efficiency of the tactic or a demonstration that machicolation has become so important symbolically that two rows of it were better than one. The town of Soncino is on the river border between Sforza land and land that had recently been appropriated by Venice: the double-machicolated tower can be seen as fist-shaking defiance. Symbolism was certainly present in the castle's design; Venice was to build a new town – Orzinuovi – on the other side of the river in the 1540s,

very up to date in its design, as a similar show of strength. This tower might also be taken to reinforce the supposition that flaring-out at the top of a tower has a deep-seated aesthetic importance. In this case, it is done twice rather than just once. To my eye, the result is neither elegant nor exciting, but oddly, the tower rather resembles a characteristic Venetian chimneystack,<sup>10</sup> but much larger and with an additional flourish. This style of chimney itself seems to reflect this same fondness for flaring-out of towers at the top (Fig. 6).

At the base of this tower there is a marked batter, beneath a cordon. This is an arrangement common to most *torrioni* of the period, the batter being introduced (or re-introduced) to resist cannonballs and mining. The continued use of machicolation after the introduction of such batters has been much discussed, but here the doubling of the machicolation suggests it

has an importance even with a batter. The lower range of machicolation is of course hard up against the wall of the tower, the upper one roughly above the outer edge of the batter.<sup>11</sup> Although together the two ranges would certainly clear any attackers from the foot of the tower, it is more likely that the machicolation was not primarily intended to do this, but would be used with missile-shooting weapons, to command a much wider area. Battering rams and escalate had largely fallen out of use with the introduction of cannon and the base of a



*Fig. 7. Detail of the tower in the background of the Francesco Giorgione 'Castelfranco Madonna' (inset). The Madonna and Child Between St. Francis and St. Nicasius, was executed around 1503. It is housed in La Pala of the Cathedral of Castelfranco, Giorgione's native city, in the Veneto, northern Italy.*

tower was unlikely to be attacked unless a breach had been opened up. Such a tall tower, weakened by the openings of machicolation halfway up in addition to those at the top, as well as other arrow or gun loops, must have been very vulnerable to cannon fire, just what was not wanted. This was not a design that would have a future.

A strange arrangement, but there is some evidence that this was not unique. In the background of Giorgione's *Castelfranco Madonna* of around 1503, there is a strange tower apparently with a run of machicolation just over halfway up, what appears to be a hourding or a drop-box machicolation in association with a doorway (or it might just be a balcony) further up and at the top, what appears to be a timber oversailing construction of hourdings diagonally propped in timber, with a pitched roof (Fig. 7). The whole looks rather like a structure that has been extended upwards and adapted over time. Possibly it is Giorgione's fantasy and no more, but it is suggestive that multiple layers of machicolation just might have existed in Venetian territory as well as in Sforza lands.

At the heart of Sforza territory, the castle in **Milan** (1450 onwards) shows what might be thought of as the very opposite of the tower at Soncino: a robust machicolated tower (the *Torre del Filarete*), sporting above its principal roof a smaller tower, again with machicolation and on top of that in turn, wedding-cake like, two more turrets, or a belvedere and a lantern (Fig. 8).

The lower range of machicolation is clearly usable. The upper range, if we agree that firing missiles diagonally through the openings is a way of using machicolation, could be of use too, but if double the firepower was wanted, some more suitable building form could surely have been found. Missiles dropped from this upper towerlet would of course kill or injure fellow defenders. The comparatively small projection of the upper machicolation

reinforces the idea that this is in fact a decorative element, part of an architectonic whole; the upper parts, slender and tall, are vulnerable to cannon fire. The fighting platform incorporating the lower machicolation seems to be two storeys high, with two levels of cannon ports as well as crenellation. A demonstration of power and status is what this tower is all about.

The tower-on-tower arrangement diminishing upwards is of course quite common, but few other towers are quite so elaborate. In Siena, the *Torre del Mangia* has makes a gesture towards machicolation on its upper recessed storey, but this is clearly decorative. The tower of the *Palazzo della Signoria* in Florence might just have been useful in defence after the palazzo's courtyard had fallen, as well as adding to the first line of defence, but the course beneath the topmost crenellation is merely decorative.

These Milanese and Tuscan examples of doubled machicolation diminishing upwards seem to be largely about show, but they do have a functional ancestor, a tower at **Lanuvio** in Lazio, apparently built in the early 15th century, possibly by altering and extending a round Roman tower (Fig. 9). Here the relative proportions of lower and upper towers and the lines of fire that are implied suggest that both ranges of machicolation could have been used at the same time, the upper range being used to shoot at an angle of some 20° from the vertical over the heads of the defenders below. There has been considerable repair, restoration and fairly recent (WWII) damage; many of the original details are now unclear (indeed, apparently altered) but the tower's appearance is formidable. There probably are other examples of this arrangement, but there are many more of simple, un-machicolated smaller towers rising above the crenellation of towers, which is the commoner arrangement.





*Fig 8. The Torre del Filarete at Milan castle. Photo: Neil Guy*



Fig. 9. Lanuvio. Early 15th century tower, built possibly by developing a Roman tower.

Equally interesting and perhaps clearer in what it tells us is a tower or *torrião* at **Azemmour** in Morocco built by the Portuguese in about 1515 (Fig. 10). It has a flattened oval plan and machicolation that both harks back to Château Gaillard and forward to the forts at Genoa and the Martello towers at Pembroke Dock. Also incorporated into the tower are small arms slits and very large cannon ports. The tower is without batter and the machicolation is formed of what might be described as chutes, perhaps a metre and a half long that die back into the thickness of the tower, rather than being engineered by a bracketing-out above them; the form is rather like the reverse side of a cheese grater. This is different from any design of machicolation previously built.

It is an odd piece of design: machicolation continues to be used at quite a late date, but is remodelled. Remodelling suggests that even as late as this, something like machicolation was the close defence device of first choice for some people and it had not become merely symbolic and decorative; this does not even look like earlier versions of machicolation. It may be that the building material available in Morocco precluded the use of corbelled machicolation, even of the structurally undemanding type we see at Soncino and Mondavio.<sup>12</sup> Mortar made from the local lime was considered to be too brittle - the Portuguese imported massive amounts of limestone for burning - and may not have allowed the use of cantilevers, but it may be that this is a thoughtful reassessment quite unconnected with constructional problems, of what a small arms gunport needs to be if it is to defend the approaches to a tower or wall, foreshadowing, as hinted, the late re-use of machicolation in the nineteenth century.

Handguns (and at this date, still crossbows) must surely be what this machicolation was intended for: missiles dropped vertically through the openings here would only roll down the sloping chute and would have been very inaccurate. Moreover, one can see up through the machicolation openings from locations on the ground some distance from the tower, strongly suggesting a line of fire reaching that far. The Portuguese call this device *vãos para tiro mergulhante* - "holes for plunging fire," a phrase that confirms, in the use of the word *tiro*, an assumption that shooting is what this machicolation was used for. This design of machicolation actually makes it very difficult to cover the base of the tower but it does lessen the vulnerability of machicolation to destruction by gunfire. In fact, this tower is at a re-entrant angle of the curtain wall and its base can be swept from the wall. This does not apply to other parts of the town with



*Fig 10. A torrião at Azemmour in Morocco, showing unusual machicolation and blocked-up artillery embrasures*



*Fig 11. So-called Machicouli Tower, Wurzburg, showing diagonal chute machicolation beneath decorative bracketed machicolation*

this arrangement: there is also at least one straight run of the *qasba* wall designed with both similar machicolation and gun-ports. By this date, it could be argued that the use of cannon by attackers meant that to cover of the base of the wall against rams or escalade had become less important. At Azemmour, this realisation has had an effect on design. Fire from openings such as these could interdict besiegers' cannon and troops approaching any breach in the wall opened by their cannon.

The form of machicolation found here - chutes for handguns diagonally piercing the thickness of a wall - is also found three hundred or so years later on the so-called **Machicouli Tower at the Marienburg Fortress at Würzburg**,<sup>13</sup> where working embrasures are placed beneath false bracketed machicolations apparently used to suggest historical authority and power and to introduce as degree of decoration (Fig. 11). Is this use of false machicolation a hangover from late mediaeval times, or a precursor of the Romantic nineteenth century view of fortification, when German military architecture adopted pseudo-mediaeval motifs in a big way?

Finally, a look at the **Villa Giustinian at Roncade** in the Veneto.<sup>14</sup> The word "villa" is significant, because here we seem to have an authentic case of machicolation unquestionably used for only show and possibly to suggest a seignorial authority, although work done with surprising thoroughness (Figs 12, 13). The villa complex was apparently built over a protracted period, between the early 1510s and its completion in about 1529. It consists of a completely unfortified house, fashionably Renaissance in style, surrounded by what appears to be a defensible wall with rectangular corner towers and a gateway with twin round towers equipped with machicolation, the whole enceinte finished off with swallow-tailed Ghibelline merlons. The form is known as a *castello* in the region

and dates from at least the early fifteenth century and originally effectively fortified. The arrangements at the Villa Giustinian seem to suggest defence against more than wolves and roaming footpads, but in the rear wall of the enclosure is an opening into a garden, completely without a gate of any kind (at least by 1536, when a map was drawn) moreover the main gate is a triumphal arch and lacks most of the devices of a fortified gateway. The front wall has no wallwalk at all and the side walls are the outer walls of farm buildings.

It hardly seems that this is a seriously defensible complex at all, and indeed, in Tuscany, for example, similar complexes of villa and farm had been built with only the slightest token show of castle-like defensibility. Lorenzo de' Medici's Villa Poggio a Caiano dating from about 1485, has what are no less than summer-houses as its corner "towers" and a palace doorway for its gate, while maintaining the appearance of an enclosure.<sup>15</sup>

Although probably not meant to be used in anger, the defensive elements of the towers at Roncade are designed with care and are convincing. You could drop or shoot through the machicolation openings if you wanted to and the brackets are bold and business-like, resembling Tuscan work of the 1480s, for instance. They are not at all like the obviously decorative versions at the Castel Nuovo in Naples, for instance. Then we notice that the gatehouse towers with their machicolation are virtually reproduced in miniature by the chimneys of the villa and the drawing of 1536 shows something very similar.<sup>16</sup> The general profile of the chimneys is again the typical Venetian type. There may have been restoration, but it does look as if this effect was always intended. There is something very like a joke here and moreover a suggestion that forms are being used playfully, perhaps as fashion items.



*Fig. 12. A view of the front towered entrance and enclosing wall of the Villa Giustinian at Roncade.*



*Fig. 13. A view of the Villa Giustinian showing principal facade and villa chimneys.*

The villa was built after the marriage of Hieronimo Giustinian to Agnesina Badoer: a union of two of the wealthiest but also the oldest families in Venice. They did not need the trappings of feudal architecture to disguise *parvenu* status, although possibly the move from Venice to terra firma did call for the suggestion of long-term land ownership and of being part of a long-standing mainland aristocracy; there had been a castle on the site centuries before. Perhaps the Venetian chimneys show a need not to cut ties with the city. The villa has clearly been restored and has suffered from decay. The merlons of the walls and gatehouse have been rebuilt but the corner towers lack merlons and most of their machicolation brackets have been broken away. The present merlons, Ghibelline as we have seen, are puzzling – the Venetians were not known for espousing the Imperial cause and the drawing of 1536 seems to show square merlons.<sup>17</sup> But we can be reasonably sure that no restoration would have converted merely token machicolation into “real” machicolation: this was built this way.

There has never been much doubt that machicolation was used as a symbol of power and authority even when circumstances made it impracticable to use, nor that it changed through full-size but non-functional machicolation into a merely decorative motif. One thing that Roncade tells us is that we cannot be sure that the pace of this change corresponded with the abandonment of mediaeval, pre-gunpowder styles of military architecture. At Roncade, we are in a world where a client is making choices about what his building will say about him and apparently enjoying it. And this seems to include a joke!

### End Notes

1. *CSG Journal* 23, 2009-10, p. 191.
2. *The Journal of British Archaeological Association Conference Transactions No. VIII*. The article is entitled “Ecclesia Pulchra, Ecclesia

Fortis.” The title derives from Henry of Huntingdon who had written about the strength of the church in “*Historia Anglorum*” (c.1129-33.) Gem’s article is noted by Pevsner and Harris in “*Buildings of England: Lincolnshire*.” (It should be stated at this point that the present writer is not the John Harris who co-authored the Pevsner book.) Gem had proposed the idea in 1978 in a paper presented to the Society of Antiquaries and in 1984 in the essay “English Romanesque Architecture” in the catalogue to the exhibition “*English Romanesque Art 1066-1200*” at the Hayward Gallery. *Mediaeval Archaeology* 41. The article is entitled “The Early Norman Castle at Lincoln and a Re-evaluation of the Original West Tower of Lincoln Cathedral.”

3. This piece is immensely interesting in many ways, not least in its study of the use made by the Normans of Roman fortified sites. See also “In Hoc Signo” by Anthony Quiney in *Architectural History Vol. 44* (2000) which discusses the design of the west front as a whole. Quiney suggests there may have been timber “fighting platforms” spanning the portals in addition to the machicolation. One might think that anyone on the platforms was at risk from the machicolation above. Remigius (who also appears as Remi) had fought at Hastings. The tricky questions of military symbolism in cathedral architecture and the significance of the triple portal entrance are raised in Otto von Simpson “*The Gothic Cathedral*.”
4. Stocker and Vince convincingly argue for the keep, as has been suggested. There is an argument that the decorative frieze on the west front is part of a conversion of a military building into a religious one.
5. Harris, op cit. p. 193, amongst others. See the article by Peter Burton in *CSG Journal* 22, p. 228 et seq., photos 4 and 11.
6. Work certainly could be done to place this structure in the overall typology of early hall keeps. See, for instance, the work published in “A Suggested Dual Origin for Keeps” by M W Thompson in *Fortress* 15, November 1992.
7. If we accept the general idea of this building being a keep, there may be scope for suggesting alternatives to these reconstructions. The question of the east wall is difficult to resolve.

8. This problem - whether the tower, accepted as a keep, was the way into the church or not - is crucial. If it was specifically a keep, why the three portals into a ground floor space? If the narthex to the church, what defensive measures were present in the church building to equal those on the west elevation? There may be some function of the undercroft ground floor space that we are not aware of.
9. There are odd features to the wall near the junction with this tower which may be connected with a change in the design. I have made the point that rectangular towers were more common in Italy in the Middle Ages, but this is not an absolute rule. My attention has been drawn to a tower, probably originally of the late 14th or early 15th century, at the *Rocca di Sanvitale di Fontanellato* which is remarkably like the round Soncino tower, except that it lacks the upper range of machicolation. It seems very likely that it was once a shorter tower, up to the machicolation level – it almost matches other towers at the *rocca*, round ones – but has been raised in height, retaining the machicolation, when it was integrated into the residential range of a new castle. If a similar thing happened at Soncino, the relative levels of the machicolation on the round tower and the rest of the castle seem only to be explained by the round tower having been part of an earlier, lower enceinte, with round towers, perhaps of an early 15th century date, retained and raised for some reason when a new castle with higher walls and square towers was built. That would account for the anomalous round tower, but raises not only the question of why the round tower was kept and altered, but other questions as well, such as the strangely low height of the supposed original and why the original, lower range of machicolation was not demolished when the tower was raised.
10. As seen in paintings such as Carpaccio's "*Miracle of the Reliquary of the Holy Cross*" of 1494, for instance.
11. The angle of the batter here rather dispels the suggestion that vertically dropped missiles were intended to be deflected into a horizontal trajectory.
12. Undemanding because the brackets cantilever out in small steps, minimising stresses on the material.
13. (a.k.a *Maschikulis*) Built 1724-29, the architect was Maximilian von Welsch and the engineer Balthasar Neumann. The tower itself is round, too, which reinforces the mediaeval feel.
14. See Paul Holberton "*Palladio's Villas*" for the history of this villa (although no-one suggests that its unknown architect was Palladio.) See also Carolyn Kolb Lewis "*The Villa Giustinian at Roncade*," (New York 1977 - Lewis argues that the architect was Tullio Lombardo) and the review of this book in *JSAH* vol. 39, no. 3, (Oct. 1980) by George Hersey.
15. At Lorenzo's grandfather Cosimo's country houses or farms of some four decades earlier: Cafaggiolo and Carregi for instance, it is the house that has the trappings of fortification, albeit with false machicolation. At Poggio, the house is clearly and ostentatiously unfortified.
16. This similarity is the more evident because the towers are shown in the map of 1536 as having low-pitched tiled roofs over their crenellation, a feature that is often found today on other Italian castles, but the date for which is usually difficult to decide.
17. Although an 18C drawing shows these merlons as having the Ghibelline form. Some Venetian villas, though, do seem to have had Ghibelline merlons from their earliest days, for instance the Villa Porto (a.k.a the Castello Porto-Colleoni) in Thiene, a Venetian villa which seems to have been built with them in the late 1450s. They are built into the masonry of the wall of an additional storey added in about 1520 but still visible (intentionally so?). Other similar merlons on the building have been restored and might not be authentic. It may be that the move from city to countryside suggested to Porto a retrospective wish to demonstrate a Ghibelline alliance, along with a feudal past. But it may also be the case that such merlons had simply acquired a non-political decorative significance and became a fashion statement; you can see earrings formed of the CND motif worn on Coronation Street. The model might have been the Vatican Belvedere of 1484-7 (see Ackerman, "*Distance Points – Essays in Theory and Renaissance Art and Architecture*" 1991, pp. 303-320.) But there are plenty of unquestionable examples of thoughtless restoration using swallow tails, and Italian restorers do seem to have had a penchant for the shape.