

# Buchner's findings at the Horologium<sup>1</sup>

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My considerations are to be understood as a throw-in into the last debate on the Horologium Augusti initiated by L. Haselberger, and I would like to limit myself here to only two aspects.<sup>2</sup> First, I ask the question, which has hardly been touched upon in the debate, namely how great the Augustan involvement was in the Flavian meridian. Finally, I will present a surprising hypothesis, which is based on the reflection that for the Augustan period the northern Campus Martius is not to be regarded as level, just as E. Buchner has always supposed. The assumption of a flat Campus Martius has led to misinterpretations in my opinion.

*How great is the Augustan involvement in the Flavian meridian line?*

It is undisputed that the Flavian instrument was a large meridian of which only fragments have survived. By comparison, with regard to the Augustan Horologium, despite recent contradictory views concerning it, Buchner has espoused that it was not a meridian, but a colossal sundial.<sup>3</sup> This is necessary to understand Buchner's arguments presented below.

In Haselberger's debate, possible correlations between the Augustan and the Flavian instrument were mentioned almost not at all. The reason is a view not doubted by scholars, as Haselberger writes, that "This Flavian clock (hitherto unknown) cannot be identical with the instrument described by Pliny."<sup>4</sup> M. Schütz, however, confesses at least that one must assume certain resemblances to the Augustan Horologium without pushing this further, and only for G. Alföldy is it quite undoubted that the find is related to the Solarium Augusti.<sup>5</sup>

Apparently P. Heslin presented his theory of a complete new Flavian meridian so convincingly that it is not challenged in the debate.<sup>6</sup> Before I turn to his reflections, I would like to sketch out briefly the initial situation and Buchner's arguments.

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1 I am glad to deliver for Jim Evans this small contribution which was written in 2012 and formed one part of my talk "Three exceptional Horologia" given at 29 March 2013 in Lille at a conference entitled "Horologia et Solaria. Instrumentaliser le temps à l'époque romaine". Another part was published under "The Globe Dial of Prosymna," Bulletin of the British Sundial Society 25(iii) (2013), 6–12 (together with Ortwin Feustel), and a third was issued in H. Kienast, *Der Turm der Winde in Athen*, Wiesbaden 2014, 197–226.

2 See L. Haselberger, "A debate on the Horologium of Augustus: controversy and clarifications", *JRA* 24, 2011, 47–73 with responses by P. J. Heslin, 74–77, and M. Schütz, 78–86, and additional remarks by R. Hannah, 87–95, and G. Alföldy, 96–98. I thank Robert Hannah and Lothar Haselberger for debates about the issues raised here, though Haselberger, as I must confess, did not value some of my arguments presented in that paper.

3 Horologium was understood in Roman antiquity as a generic term for all kinds of time-measuring instruments. For this reason, I share the view of Heslin 2011, 77, that the term implies that the instrument was a clock, but also, that it was a meridian line.

4 Haselberger 2011, 56.

5 Schütz 2011, 78; Alföldy 2011, 96, who mentions the lettering of the Solarium Augusti as if it is identical with the lettering found on the meridian line.

6 P. J. Heslin, "Augustus, Domitian and the so-called Horologium Augusti", *JRS* 97, 2007, 1–20, here 9–10.

The most important evidence that the meridian comes from the Flavian period is the layer in which it was found.<sup>7</sup> So it is clear that in the Flavian period renovations were carried out on the Augustan meridian. But how far did these go? The question is of importance for this reason, because Buchner, despite extensive digging and coring, did not obtain a reliable result from the original installation.

There are some possible solutions for the riddle of the disappeared Augustus meridian. One is that the Augustan Horologium still lies underground, but somewhere else. Buchner, but none of the other scholars, has assumed that. Heslin has pointed out that one is able to explain the Flavian renovation measure against the backdrop that an emperor of that time, especially Domitian, was perceived as guardian and renovator of the Augustan building projects.<sup>8</sup> So with the renovation of the meridian they will not have interfered with the iconic nature of the Augustan building program and therefore will have left the meridian on the spot where Augustus put it and linked it with the other buildings of the Campus Martius.<sup>9</sup> That means that the Augustan meridian lays where Buchner supposed it did and at no other place underground, only probably deeper.<sup>10</sup>

According to Buchner, the Augustan tiles were removed in order to reuse them with the new Horologium. Buchner wrote, however, not explicitly of a reuse, therefore the passage in which he points it out is easy to overlook, but he spoke of a “new layout” of the Augustan Horologium and that “also the obelisk” had a “new position on a level of 10.80 NN”.<sup>11</sup> This *also* includes with it the meridian line and the “new position” means lifting it up without an alteration or even destruction.<sup>12</sup>

He expressly distanced himself here from his original version, in which he had also foreseen a reuse of the tiles, but in the reverse position, whereupon bronze lines had been placed with intervals decreasing a little, because through the obelisk remaining in its original position and by the uplifting of the tiles the working height of the gnomon would have become smaller.<sup>13</sup> The

7 Haselberger 2011, 56.

8 For Vespasian speaks the cippus from AD 75 found west of the Horologium, which was almost at the same height level as the renovated meridian line, see E. Buchner, *LTUR ITT* (Rome), 35–37, and Haselberger 2011, 57, while E. Buchner, “Solarium Augusti and Ara Pacis,” *RömMitt* 83, 1976, 319–365, here 362, and Heslin 2007, 16–19, favoured Domitian and his connection to the Augustan program of power. Above all, it was Domitian who wanted to distinguish himself as a calendar reformer and he renamed September and October Germanicus and Domitianus (Sueton 13.3).

9 See in particular Heslin, 2007, 16, n. 79.

10 Probably, because Buchner states that the levels for the Augustan foundation are between 8.65 NN (1996) and 8.91 NN (“Horologium Solarium Augusti. Bericht über die Ausgrabungen 1979/80”, *RömMitt* 87, 1980, 355–373, here 361), without providing any further details. NN means something like MSL (Mean Sea Level), so 8.65 NN means 8.65 m above MSL.

11 Buchner 1994, 81, and 1996a, 36.

12 The addition of “without an alteration or destruction” is a compelling conclusion, which Buchner himself did not draw. It is pointless to ask why he did not. It is typical that he, in his articles that have been published after the essay by Schütz on the question of the maintenance or destruction, communicated his ideas only shortly, withdrawn from any conclusion and left it to the reader. Another example is Buchner 1996, 36, where he made the important statement that the Flavian Horologium was a meridian line only in a subordinate clause and with the words “reduced to a stripe.” I should add, however, that Buchners text is always in German, and the translation given is always mine.

13 Compare Buchner 1980, 364 for the decreasing, 368 for the uplifting and 372 for keeping the obelisk in its original position.

new solution now offered the advantage that not only the tiles but the meridian line could be re-used in their entirety.<sup>14</sup>

Buchner's new suggestion, however, is unlikely because laying down the obelisk and setting it up again at almost the same place would mean a complicated and considerable expenditure at that time.<sup>15</sup> Such a measure is only then entered upon, if no other simpler solution is offered.

Is there such a solution? Was it actually simpler to carry away the Augustan stones, to dispose of them and to set up a complete new layout, with new stones and a new meridian line? Was it absolutely essential or was one not able to reuse Augustus' layout differently, perhaps even preserve it differently? These and other questions are raised, when one rejects Buchner's explanations.

But Heslin when he comments Buchner's ideas does not enter into such questions at all, perhaps because he wrongly understands Buchner's intention. He writes namely that "destroying the Augustan pavement and relaying the instrument in a reduced form... is the approach Buchner now takes."<sup>16</sup> One can in fact interpret Buchner's statements with regard to the area right and left of the meridian, though Buchner did not speak of destruction at any point, but it is incorrect to apply his approach to the meridian line for the reasons mentioned above.<sup>17</sup>

But Heslin, acting as if he agreed with Buchner on this issue, turns Buchner's intention into its opposite, when he writes that the Augustan tiles have not survived because they were destroyed, or that in the Flavian period they constructed an entirely new meridian.<sup>18</sup>

But suppose it was as Heslin claims that the old layout was destroyed under Domitian and as an innovator he probably "remodelled" it. What then is one to ask, what idea, what feature of the new instrument was actually introduced by Domitian? Heslin thinks that Domitian "did not dramatically change its nature,"<sup>19</sup> without however elaborating further. I would like, therefore, to draw attention to a few points about why the instrument misses any special Flavian influence.

First, from the inscription no definite date has been derived. It could have belonged to the Flavian period as well as the Augustan.<sup>20</sup> It is, as already pointed out, a Greek and not a Latin inscription, as one might have expected.<sup>21</sup> But that a Flavian ruler should have decorated a monument with a Greek inscription is strange. Besides the scientific orientation of the instrument, which was helpful for Augustus and his calendar reform, there is a second subject to mention: the meridian and obelisk are to be seen as uniform booty from Alexandria, at that time the

14 In the supplement of E. Buchner, *Die Sonnenuhr des Augustus* (Mainz 1982) 80, he writes of the Augustan bronze letters that they had been separated out and re-used. With the new solution the letters could be reused alongside the bronze lines without alteration.

15 See the difficult erection of the Vatican's obelisk, described by D. Fontana, *Della Trasportatione dell'Obelisca Vaticano et delle Fabriche di nostro Signore Papa Sisto V* (Roma 1590). Add to that the establishment of a new foundation of our obelisk next to the old one, in order to realise exactly Buchner's reasoning, although, Pliny *NH* 36.73 wrote that "the foundation reached so deep in the soil, as the obelisk was high", see also Heslin 2007, 13.

16 Heslin 2007, 9.

17 The misunderstanding continues when Heslin writes quite generally and without a differentiation thereof that Buchner, after he had initially considered a reuse of the Augustan tiles, later described the pavement of the meridian as Flavian, see Heslin 2007, 8.

18 Heslin 2007, 16: "A new pavement was therefore laid that made the readings accurate once more."

19 Heslin 2007, 10.

20 On the position in time of the letters, see Buchner 1982, 80.

21 In A. M. Bandini, *De obelisco Caesaris Augusti e Campi Martii ruderibus nuper eruto*, Rome 1750, the meridian line (Tab. IV Fig. I) was labelled in Latin.

centre of Greek science.<sup>22</sup> Moreover, the meridian displays no Flavian influence: Domitian, for instance, could have made clear his calendar efforts by adding at least his new month to the calendar, but this did not happen.<sup>23</sup>

What is to be made of all this: a missing Augustan meridian and a Flavian one, which looks as if it were Augustan? Was Buchner perhaps right with his assertion that the whole layout had been raised by about 1.5 metres? Actually there is a much simpler solution, which has so far not been considered at all.

### *A reevaluation of the architectural layout of Augustus Horologium and the Flavian renovation*

Buchner estimates a horizontal surface of 9.10 to 9.45 NN for the Augustan layout, because it runs out from the foundation height of the Ara Pacis and he treats the Campus Martius as a horizontal surface, on which they were able to install a huge horizontal dial. But now it is doubted if one should really proceed from a level Campus Martius. Buchner himself recently worked from this idea and said from it that one must consider a lowering of the Augustan line network compared with the level of the Ara Pacis by 40 cm.<sup>24</sup>

But I would like to go further. The northern Campus Martius for its part was only loosely deposited and had unstable alluvial soil which was difficult to secure and to strengthen permanently. Any effort in this respect would have been nullified again with the next major flood. This would have also been taken into consideration in the planning of Augustan buildings: the elevated position of the Ara Pacis, to which one had to climb up a staircase from the Campus Martius, provides an example of how they wanted to protect themselves against flooding.<sup>25</sup> This makes an unsecured, large flat sundial unlikely.<sup>26</sup>

But if one frees himself from the idea of a colossal sundial, a new possibility comes into focus, which is illustrated in Fig. 1. The proposition is based on Haselberger's value for an elevated

22 The booty is comparable with the first sundial that Valerius Messala brought to Rome in 262 BC and had set up in the forum (Pliny *NH* 7.213–215; Cens. 22, 7); T. Gesztelyi, "Alexandria in Rom," *ActaClDebre* 38–39 (2002–3), 65–70, 68, has accepted that "even the network of lines, or at least its most important parts" were taken from Alexandria to Rome, for him an explanation of why the device was not correct. I think that one can rule that out, but in order to prevent reading errors as happened with the establishment of the first sundial in Rome, one corrected the division of the meridian in accordance with the local latitude. Pliny is clear that at the latest since the year 164 BC one was familiar with the local latitude function of dials. Consistent with that, Pliny did not now give human errors as a reason for why the reading of the obelisk was not at all exact, but the influences of nature, see A. Wolkenhauer, *Sonne und Mond, Kalender und Uhr* (Berlin 2011), 255–6.

23 The excavation revealed 11° of Virgo, which includes the first days of September. But a reference to the month Germanicus for September is absent.

24 Buchner 1996, 36; in E. Buchner, "Neues zur Sonnenuhr des Augustus," *Nürnberger Blätter zur Archäologie* 10, 1994, 77–84, here 81, it is "ca. 30 cm."

25 Buchner 1994, 83, speaks only of safeguarding the obelisk "against sinking into the soft alluvial land." But just as important were measures against inundation. Such a simple measure at the obelisk could be a higher setting of the bench; with the Ara Pacis, however, only a 2 metre high retaining wall helped, see F. Rakob, "Die Urbanisierung des nördlichen Marsfeldes. Neue Forschungen im Areal des Horologium Augusti," *L'Urbs. Espace urbain et histoire* (Cahiers 98, 1987) 687–712, here 700.

26 Rakob 1987, 696, note 29, therefore, says also, at least with the Flavian Horologium, that possibly because of changes to the terrain as a result of flooding, this must have been reduced in its largeness. Also not to be ruled out should be "a sink area west of the Augustan square and its shift to the east."

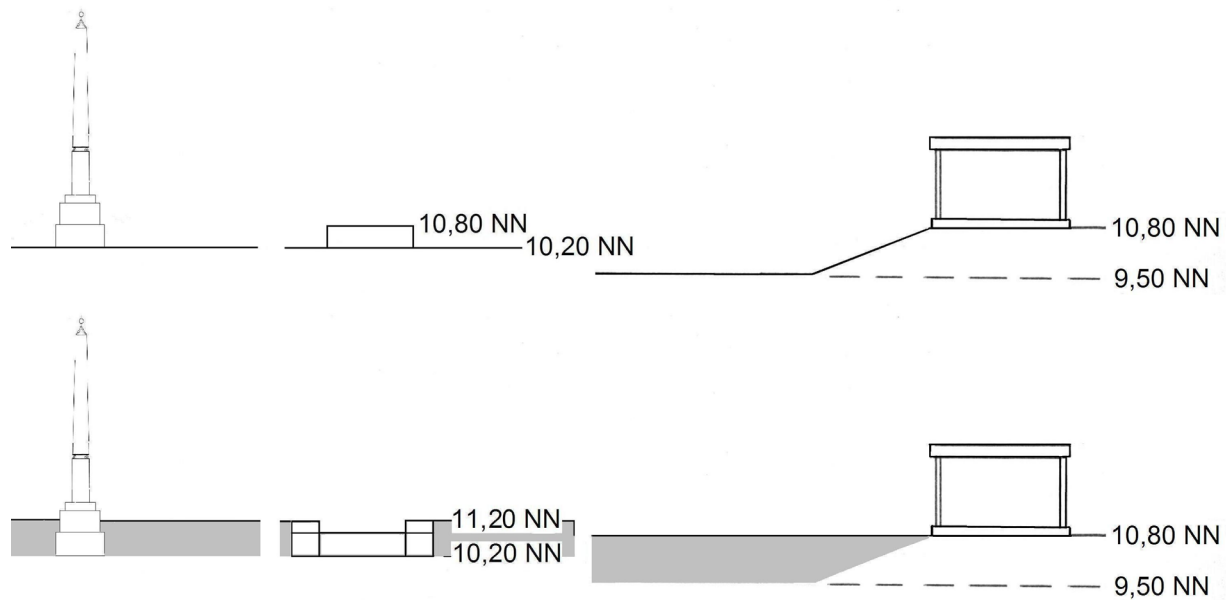


Figure 1. Meridian line in Augustan (top) and in Flavian time (below). Author's drawings, not to scale.

Augustan foundation in the vicinity of the obelisk (10.20 NN).<sup>27</sup> The data on the Ara Pacis comes from F. Rakob.<sup>28</sup> A peculiarity is that the Augustan meridian lies on the ground up to a level of 10.80 NN (Fig. 1, top). The height difference between the Augustan and the Flavian horizon of about 60 centimetres agrees with the statement in Buchner, when he says, “the blocks of the ‘Domitian’ dial are 40 centimetres thick and rest on a foundation of 20-30 centimetres.”<sup>29</sup> This obtains a striking agreement with the horizontal surface of the Ara Pacis, which suggests that both measures form the basis of a common design concept.

Not only the elevation data, but also the Horologia themselves, suggest this interpretation. For in antiquity they were usually independent, self-standing objects and only in the late Roman period and even later then in Byzantine times or the Islamic Golden Age they were integrated also into the ground, a wall or a general building structure.<sup>30</sup> Typical examples are shown in Fig. 2 and 3: a Roman raised dial on a column at Palmyra and an integrated column dial from the Islamic Age.<sup>31</sup> In addition, a raised position of the meridian had a particular signal effect and helped to emphasise the midday shadow casting.

How must one now consider the Flavian renovation? Important in this context is a comment by Buchner, which was made clear for the first time by Haselberger: “As for the meridian’s

27 Haselberger 2011, 61-62 and Fig. 10.

28 Rakob 1987, Fig. 7.

29 Buchner 1982, 78, or 1980, 358: “57 cm between the top edge of the foundation and the Augustan level.”

30 The first sundials were, with the Tower of the Winds, drawn or respectively painted on a wall, as is usual today. The peculiarity of the Tower is comprehensible if one recognizes it not as a building but as a huge multi-faced sundial.

31 Also the two hitherto known vertical meridian lines in Miletus and Chios, see K. Schaldach, “Eine seltene Form antiker Sonnenuhren: Der Meridian von Chios,” *ArchKorr* 41 (2011), 73-83, have not been worked into walls or floors, but into free standing stones. The large horizontal dials worked into the pavement of Thamugadi, today Timgad, and in Lambaesis (Tazzoult-Lambèse), the headquarters of the Legio Tertia Augusta under Hadrian, see A. Guerbabi, *Atti del x Convegno di Studio Sassari* 1, 1994, 359-402, both dating from a later period.



Figure 2. Sundial in Palmyra, at a column erected in 64 for Shalamallat, son of Yarhibola (author's photograph).

original setting, the different surface treatment of the pavement is telling: while the broader middle stripe with its bronze insertions shows a smooth surface, the two lateral stripes feature roughly-carved surfaces and open-lying clamps, a clear testimony that these lateral stripes were originally covered by at least one more layer of stone, about 1.50 metres in width. *Thus in its original state the pavement was flanked by broad (and shadow casting) boarder walls*” (Italics mine).<sup>32</sup> Buchner shies away from the consequences that result therefrom. He therefore formulates this in the subjunctive: “stone blocks would have actually been on both sides of a cultured, elevated stripe, the shadow edges were cast out to the west of it in the morning and to the east side in the afternoon; only at the moment of day’s highest solar altitude, at midday, would a shadow have been cast out on neither side.”<sup>33</sup>

One must know that Buchner, when he writes this, is still proceeding from a colossal Flavian sundial. A layer of blocks on either side of the meridian would fit poorly with this, for the midday line would be isolated from the other parts of the sundial and lines would have been obscured or shaded. All the same, he admits that the meridian was nestled between blocks, which he dismisses as seating.<sup>34</sup> But they were present *as broad boarder walls*, for it is not credible that the structure framing the meridian had the sole task to serve as a bench.<sup>35</sup> More practical considerations are suspected: especially that the wall helped as a barrier against further masses of earth. Moreover, the play of light—as with the elevated meridian—was in addition carried, when at midday only the shadow of the obelisk with its sphere fell in the pool between the tiles, whereas at other times of day the curb stones cast a shadow on the midday line.<sup>36</sup>

The Flavian wall was presumably not a boundary layer, which separated the meridian from the rest of the Campus Martius, but part of an earth structure, which bordered it basin-shaped,

32 Haselberger 2011, 55, see also Fig. 7.

33 Buchner 1980, 365.

34 Buchner 1980, 365.

35 See Haselberger 2011, 55.

36 Schütz 2011, 80, therefore agrees when he says: “Thus, true noon could be ascertained with high accuracy.”

so that it was lowered compared to the level of the surroundings. This is supported by the remnants of a water basin, which dates from the time of Hadrian or even later.<sup>37</sup> This basin, which was built up over the meridian, follows its lines closely. But, we must ask, why one came exactly here, to build such a pool, unless the previous structure had suggested such an idea?<sup>38</sup>

The height of the Flavian wall can only be estimated. The top of the meridian lies at 10.80 NN, in addition taking into account a wall, the view to the meridian from the altitude of the bench at the obelisk might possibly have been obscured. It could therefore be that the second seat at the so-called Hadrian height of 11.66 NN dates from the Flavian period, with which then a wall height of up to 0.86 metres is conceivable. On the other hand, Rakob gives block heights of 30 centimetres, which can be regarded as a lower limit for the height of the wall.<sup>39</sup> All values between 30 centimetres and 86 centimetres are thus feasible, but a higher wall is to be preferred, should it have endured for several years. In the drawing (Fig. 1, below) the lower limit value was chosen.

A look at the unglazed verges on both sides of the meridian line confirms this solution: they look like they were pushed out, for the transverse edges show no relation to the corresponding



Figure 3. Sundial of Ahmad al-Halabi (†1455), chiselled into a column of the Dome of the Treasury in the Umayyad Mosque of Damascus (author's photograph).

37 For summary, Haselberger 2011, 55.

38 Thus already Buchner 1994, 81.

39 Rakob 1987, n. 19.

edges of the meridian.<sup>40</sup> The overhanging blocks must have then, in the time of Hadrian, in the course of the rearrangement and enlargement of a water basin, been removed and were probably incorporated into the new wall.<sup>41</sup>

### Conclusion

These reflections show that the findings published by Buchner can also be interpreted differently. If it was a meridian line that Augustus set up on the Northern Campus Martius and if the whole area was not as plain as Buchner claimed we have to take into consideration that the piece which was laid open is nothing else than a part of the original Augustan Horologium just as Pliny described it, what means as well that there was no other lay-out at a lower level.

The interpretation is consistent with definite data of the excavation, with the formulation of Pliny and it always takes into consideration that a mass of earth was held off from the line.<sup>42</sup> With it Buchner's reconstruction regarding the complex new laying of the meridian and the obelisk is obsolete. But above all it means nothing more than that Buchner actually found the Augustan meridian line, but he therefore did not want to admit it, because he had started out from a colossal horizontal dial.

Against the hypothesis of the unaltered meridian is only the recovery of post-Augustan pottery underneath of the find. From the data no indication is given, whether the pottery was found underneath of the midday line or in the area just beside. But due to my new interpretation, the stones of that area were added only in the Flavian period.

Unfortunately we have for the present no possibility to decide if the new interpretation weighs the conditions more precise than the common view as there is a conflict of law at the moment between the owner of the house where the meridian line is situated and the German Archaeological Institute in Rome. Therefore it is not possible now to make available new informations, for instance a check if my new interpretation is right. This would be the case if the lateral faces of the meridian stone covered by the edges stripes were so finely smoothed as its upper surface with the calendar.

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40 See Haselberger 1911, 54 fig. 7.

41 Buchner 1996, 36 speaks of a "travertine-balustrade (above ground level)" which were possibly built by travertine stones of the Flavian renovation.

42 Pliny *NH* 36.72 wrote of *strato lapide*, which Buchner 1976, 323 translates with *spread out stone*, in order to interpret it readily—like others—as pavement or stone slabs. But if one assumes that here a long line of adjoining stones was spread out on the Campus Martius, Pliny's choice of words makes almost more sense.