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TIMEKEEPING IN THE ROMAN ARMY*

1. INTRODUCTION

The structure and organization of the Roman army is a complex subject for ancient historians. Of its multiple aspects, the schedule of the daily routine is one of the most interesting but, at the same time, is scarcely known. Of course, huge progress has been made with the publication of the daily rosters of one particular auxiliary unit in the East (*cohors XX Palmyrenorum*, at Dura, Syria),[1] but the detail of the chronological organization of the unit's schedule is still to be revealed.

A rather simple inscription from Apulum offers important evidence for professional military ranks in the Roman army in Dacia and elsewhere, and also relates to the present investigation. *CIL* 3.1070 (= *ILS* 5625 = *IDR* 3/5.193) is a votive plaque presently lost; only some drawings remain.[2] The text is as follows:

I(oui) O(ptimo) M(aximo) et Iunoni Regin(ae)
pro sal(ute) Imp(eratoris) M(arci) Aur(eli) An
tonini Pii Aug(usti) et
Iuliae Aug(ustae) matris Aug(usti)
M(arcus) Vlp(ius) Mucianus mil(es) leg(ionis) XIII Gem(inae)
horologiar(ius?) templum a solo de suo ex uoto
fecit Falcone et Claro cons(ulibus)

To Jupiter, the Best and Greatest and to Juno the Queen, for the health of the Emperor, M. Aur. Antoninus Augustus, The Pious and of the Mother of the Emperor, Julia Augusta, M. Ulp. Mucianus, soldier of the legion XIII Gemina, '*clockmaker*?', has erected the temple, alone, on his expense, following a vow, in the time of the consulship of Falco and Clarus.

We are dealing evidently with a votive monument erected by a legionary of *XIII Gemina* to Jupiter and Juno, for the health of Emperor Caracalla and his mother, mentioning the construction of a sanctuary involving a soldier with the role of clockmaker. However, the status of the character has not always generated agreement[3] with most scholars

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[1] Most of them gathered by R.O. Fink, *Roman Military Records on Papyrus* (Ann Arbor, 1971).

[2] That of Bongarsius is the most accurate and reliable acc. *IDR* 3/5, 148. See also the partial drawing of Ariosti, which has the same text. He took the monument to Vienna, where it was consequently lost. See A. Buonopane and V. La Monaca, 'Le iscrizioni della Transilvania nel codice Veronese di Giuseppe Ariosti (Biblioteca Capitolare, cod. CCLXVII)', in G.P. Marchi and J. Pál (edd.), *Epigrafi romane di Transilvania raccolte da Giuseppe Ariosti e postillate da Scipione Maffei. Bibliotheca Capitolare di Verona, Manoscritto CCLXVII. Studi e ricerche* (Verona and Szeged, 2010), 245–374, at 272 and G. Ariosti, *Inscrizioni antiche della Transilvania* (Vienna, 1723), I.XIX.

[3] I. Piso, *Inscriptions d'Apulum* (Inscriptions de la Dacie romaine – III 5) (Paris, 2001), 147–8 = *IDR* 3/5.

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doubting the possibility of this soldier being a *horologiarius*.[4] This particular inscription crucially raises more general questions relating to the subject of timekeeping in the Roman army, an interesting subject for which there are, however, few sources.

2. TIMEKEEPING IN THE ROMAN WORLD

Time and timekeeping in Greek and Roman antiquity is a complex matter of debate, especially as ancient sources commenting on the subject in some cases engage with very precise technical details.[5]

Throughout Roman history, even as late as the mid third century A.D., ancient writers complain about the scarcity of the sources on the subject of timekeeping. Three such writers approach the matter of the origins of timekeeping and *horologia* in the Roman world, all of them reaching the conclusion that the division of the day by hours was introduced in Rome in the third century B.C. and the adaptation of the first solar clock at the latitude of Rome took place sometime around 164 B.C.[6]

The Romans used several separate pieces of equipment for measuring time, one of them related to the Sun and the other two to water. The sundial (*horologium*)[7] was used during sunlight hours, the *klepsydra*[8] was used for the measurement of fixed amounts of time, probably borrowed from Greek law courts,[9] while the water clock was used by night, in interiors or through cloudy days. The difference between the two water-operated mechanisms is appreciated since antiquity.[10]

[4] As it has been considered first by A. von Domaszewski, 'Die Religion des römischen Heeres', *WZ* 14 (1895), 1–129, at 103; cf. id., *Die Rangordnung des römischen Heeres* (Bonn, 1908[1]), 46. *Contra*, see n. 62 below.

[5] The most complex description is that in Book 9 of Vitruvius (*De arch.* 9.7.1–8.14); see also Plin. *HN* 7.212–15; Gell. *NA* 3.2.1–16; Varro, *Ling.* 4.4 and Censorinus, *De die natali* 23.7.

[6] J. Bonnin, *La mesure du temps dans l'Antiquité* (Paris, 2015), 60–3. Confusion in the precise terminology is noticeable throughout these texts. Varro (*Ling.* 4.4) debates the terminology of the *solarium*, the sundial, which shows the hours of the day from the Sun, and was first placed by Scipio Nasica near the *basilica Aemilia* and the *basilica Fulvia*. Pliny (*HN* 7.212–15) places the introduction of hours in Rome after the Twelve Tables, but gives more precise dates for the adoption of the Greek sundial from Catania, after the First Punic War (263 B.C.), and also for the building of the first sundial adapted to the latitude of Rome (164 B.C.). On the matter of the clock placed by Scipio Nasica, he argues that it actually is a complicated water clock, made for timekeeping also during the night (159 B.C.). Censorinus (*De die natali* 23) confirms this chronology and adds that the Romans were the first to measure the day from midnight to midnight and that the Twelve Tables divided the day into only four parts, like the military *uigiliae* at night.

[7] For general information and terminology, see *RE* VIII.2, cols. 2416–28; *DNP* 12/1, cols. 971–3; S. Gibbs, *Greek and Roman Sundials* (New Haven and London, 1976); Bonnin (n. 6), 85–6; and, for Dacia, F. Marcu, 'The sundial from Floreşti', in H. Pop et al. (edd.), *Identități culturale locale și regionale în context european. Studii de arheologie și antropologie istorică. In memoriam Al. V. Matei* (Zalău, 2012), 533–8.

[8] See *RE* VIII.2, cols. 2428–33; *DNP* 12/1, cols. 973–6. For the clarification of the term, see J. Bonnin, 'Wasseruhr und Klepsydra. Zeitmesser der Antike', in *Sonne Zeit, Rundschreiben der Arbeitsgruppe Sonnenuhren im Österreichischen Astronomischen Verein* 45 (June 2013), 11–13 and id., (n. 6), 56–60 and 85–6.

[9] Bonnin (n. 8), 11–12 records several references to it in Greek literature (Aristophanes, fifth century B.C.), mentioning it as a couple of pots for the controlled draining of water, used as a stopwatch in courts, and noting that archaeological finds are few, but relevant, especially from Athens in the fourth century B.C.

[10] Bonnin (n. 8), 12–13. Also worked by water, it can measure significantly larger amounts of time and can record the hours' succession (*horologion*, *hydrion horoskopeion*, *hydrologion*, *aqua horologium*, *hor. hibernium*).

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One might assume that the ancient clocks were at best approximate, and that exact timekeeping, at least in the civilian environment, was not a matter of too much concern.[11] In fact, detailed discussion on the matter of the daytime division into hours and the need to precisely evaluate these divisions points in a different direction. An inexact sundial from Sicily was used incorrectly in Rome for 99 years, without raising significant issues for the population.[12] On the other hand, the problem is noted repeatedly in Roman literature, and the establishment of a sundial adapted to Rome's latitude is acclaimed.[13] We can only assume that, by the third and second centuries B.C., the Romans were more likely to need general indications of the time of day rather than precise and detailed ones.[14]

As far as epigraphy is concerned, clocks are mentioned especially in the form of *horologia*,[15] at a first glimpse in around one hundred instances, in both Greek and Latin, throughout the Roman world. Most of them are to be found in Italy and the western provinces, with the vast majority, more than 90%, occurring in civilian environments. Often the clock is part of a larger monument or public building complex,[16] the most famous being Andronicus' Tower, nowadays the *Tower of the Winds*, from Athens, dating back to the first century B.C.[17] These clocks were considered important artefacts, as they needed to be decorated[18] and they seem to have been operated by slaves.[19]

The making of such clocks is another matter, as Vitruvius (*De arch.* 9.7) argues that even if many books were available for the construction of portable clocks, their construction was accessible only to those that knew the *analēmma*—the skeletal celestial sphere, therefore confirming that there were no practical methods to construct sundials or water clocks available to the public.

Moreover, epigraphic evidence suggests that there were special workshops and craftsmen concerned with their fabrication. Inscriptions of Asia Minor record both

[11] J. Carcopino, *Daily Life in Ancient Rome: The People and the City at the Height of the Empire* (New Haven, 1940); J.K. Wright and A.K. Lobeck, 'Man and time in ancient Rome: notes on a recent publication', *Geographical Review* 31 (1941), 659–62.

[12] Bonnin (n. 6), 63–5.

[13] Bonnin (n. 6), 63–4.

[14] When considering that by 190 B.C. the month of March fell in October, the matter of the hours of the day seems not so significant: see P. Derow, *Rome, Polybius, and the East. Edited by A. Erskine and J. Crawley Quinn* (Oxford and New York, 2015), especially 212, 214–15, 222–35 and Bonnin (n. 6), 64–5.

[15] The first mention of a *horologium* in the Roman world comes from Alatrium, datable between the years 134 and 90 B.C.—*CIL* 12.1529: see Bonnin (n. 6), 70.

[16] *AE* 1975.232 (Italy): *h. praetorii*; *CIL* 2.4316 (Taracco): *h. collegii fabrum*; *CIL* 2.93 (Baetica): in a public place; *CIL* 8.978 (Africa) and 10.831 (Italy): *scholas item h.*; *CIL* 8.25533 (Africa): *h.* with columns and portico; *CIL* 9.2334 (Italy): *h.* with a table; *CIL* 13.11978a (Upper Germany): *h. et aedes cum ornamentis suis omnibus et signis*; *CIL* 5.2035 (Italy) and IRC 3.38 (Spain): *h. cum sedibus*; *CIL* 6.10237 (Rome): *h.* with a marble basin; *CIL* 10.5807 (Italy): *h.* in a building complex; *CIL* 12.3100 (Nîmes): *h. cum II cerulas argenteas*; *AE* 2005.454 (Italy): *h. distylis signisque* (with two metal rods); *CIL* 12.2522 (Narbonensis): *h. cum suo aedificio et signis*. The earliest discoveries of sundials come from Umbria and Pompeii, both datable to the second century B.C., according to Bonnin (n. 6), 69.

[17] Also mentioned by Vitruvius (*De arch.* 1.6). H.J. Kienast, *Der Turm der Winde in Athen* (*DAI Archäologische Forschungen* Band 30) (Wiesbaden, 2014), 120–8. In fact, this complex installation held an armillary sphere inside, giving it an astronomical and astrological role, to present the mechanisms of the universe.

[18] *CIL* 12.535, Italy.

[19] *CIL* 12.2522, Narbonensis: … *ad id horologium administrandum seruum*.

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what seems to qualify as a workshop for sundials[20] and special craftsmen who are in charge with their construction.[21] Magistrates, especially consuls, usually pay for their construction and they are intended to be installed in political and juridical places in the city, therefore bearing, at least initially, an exclusive political role.[22]

An overview of the matter indicates that sometime in the sixth or fifth centuries B.C. the first concerns for the scientific approach of the cosmos and the calendar occur, and by the fourth century also the first sundials, *klepsydrae* and hydraulic clocks, borrowed and adapted by the second century B.C. also in Rome.[23]

3. TIMEKEEPING IN THE MILITARY

Literary Accounts

In the military, timekeeping must have been at least as important. The division of the day by hours, both in civilian and military environments, is known since the seventh century B.C.,[24] from Egypt, but from the first century B.C. onwards the sources come exclusively from the Roman world,[25] which may derive from the establishment of a professional soldiery and semi-permanent provincial garrisons.

Ancient authors admire the unity of action of the Roman military machine. Josephus (*BJ* 3.85) is impressed by the fact that the entire camp wakes, eats and goes to work at the same time. The march is also something to be chronologically defined; Vegetius (*Mil*. 1.9) observes that an infantry unit must march twenty miles in five summer hours.[26] Even if the schedule must have suffered alterations, a unity of direction and a well-established program must be presumed.[27]

We know of few accounts in ancient sources relating to precise timekeeping in the army. Even so, Josephus (*BJ* 6.58, 68, 79, 131, 147, 157, 244, 248, 290, 294) notes that action was planned by the hours, when describing Titus' siege of Jerusalem.[28] Polybius argues that an ideal commander must be able to tell the time of the day, to ensure his success in campaign.[29] As no actual mention of a sundial or water clock appears in these instances, we might assume that astronomical reckoning is used. A classic example of the relativity of actual timekeeping is the battle of the Colline Gate in 82 B.C. at the end

[20] *AE* 1992.1620 (Bacakale, Asia): … *officina horologi caesura*. See also M. Christol and T. Drew-Bear, 'Les carrieres de Dokimeion a l'epoque Severienne', *Epigraphica* 53 (1991), 113–74, at 135–7: the *officina* could have served for the fabrication or most likely the restoration of a monumental *horologium*.

[21] *SEG* 36.1153: Αἰλιανὸς Ἀσκληπιόδοτος γνωμονηκός—dedication to Nemesis by a clock-maker; and *IGRR* 3.1397 (A.D. 288–289): an unknown ὡρολογιά[ριος] τῆς τετρακονίας—attesting the clock-makers of the metropolitan rural community around Nikaia; both of Nikaia, Bithynia and Pontus. See also Bonnin (n. 6), 85–6.

[22] Bonnin (n. 6), 68.

[23] Bonnin (n. 6), 71.

[24] G.J. Whitrow, *Time in History. Views of Time from Prehistory to the Present Da*y (Oxford and New York, 1988), 28.

[25] Bonnin (n. 6), 267–8.

[26] *militari ergo gradu XX milia passuum horis quinque dumtaxat aestiuis conficienda sunt.*

[27] S.E. Phang, *Roman Military Service. Ideologies of Discipline in the Late Republic and Early Principate* (Cambridge, 2008), 213.

[28] See also S. Remijsen, 'The postal service and the hour as a unit of time in antiquity', *Historia* 65 (2007), 127–40, at 140.

[29] Polyb. 9.14–15.

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of Sulla's Civil War, where ancient sources give approximate and sometimes contradictory time relations.[30] On the other hand, Caesar in 54 B.C. acknowledges that night-time hours are shorter in Britain than on the Continent, measuring with a water-operated timepiece.[31]

At the same time, the duty rosters of Dura,[32] Vindolanda or Egypt present tasks set out by day, not by hour, like in the modern armies.

The best-known instance of temporal organization inside the Roman army is the night watch (*uigiliae*), divided into four equal parts of three hours each, with the help of the *klepsydra*.[33] This is one of the most important tasks of the army, as is also evident from the strict system of the watchword, written on *tesserae* and distributed only by specialized *principales*, the *tesserarii*.

Archaeology

Archaeology also contributes to the issue, with a series of time markers being discovered in forts or locations related to them.[34] One of the most discussed such finds is a recently discovered bronze disk fragment from Vindolanda.[35] It was subsequently considered to be an anaphoric water clock[36] or an astrological calendar,[37] this not diminishing the significance of its discovery in an auxiliary fort on the northern frontier. It is a precious indication of the need for chronological unity in the empire's armies, and the usage of precise timekeeping in the military environment. Two other similar artefacts were discovered in Britain, at Housesteads and Richborough, both rudimentary but relatively usable. These being the only such discoveries coming from Roman Britain, one could argue that in this province the military brought the Roman clocks and timekeeping.[38]

Epigraphy

A series of newly published *ostraka* from the Krokodilô fortlet in Egypt sheds some light also on the usage of daytime hours in the Roman army. These are daily registries for the arrivals and departures of soldiers and messengers in this military post station. This is a small-scale building, fit for ten to fifteen soldiers, led by a *curator praesidii*. For each day and each messenger, the time of arrival, the source and content of the package and the time of departure are registered. The sources present different hours in the day, telling us that timekeeping was an exact matter in this situation, and was probably the task of the *curator*, using a water clock.[39]

[30] App. *B Civ.* 1.93—late in the afternoon; Plut. *Sull*. 29.3–6—at the fourth hour/daybreak.

[31] Caes. *BGall.* 5.13: *nos nihil de eo percontationibus reperiebamus, nisi certis ex aqua mensuris breuiores esse quam in continenti noctes uidebamus*: see J. Bonnin, 'Time keepers in Britain 43–780 A.D. Origins, the Roman contribution, and Anglo-Saxon continuity', *British Sundial Society Bulletin* 22 (2010), 34–7, at 36, and id., (n. 6), 268.

[32] See Fink (n. 1), nos. 1, 2, 9, 10 and 47.

[33] Polyb. 6.35.6–36.9; Veg. *Mil.* 3.8.16–18; *Dig*. 49.16.12.2. Phang (n. 27), 213.

[34] Bonnin (n. 6), 270 reports eight such finds, from which six are related to forts. See also Marcu (n. 7).

[35] M. Lewis, 'A Roman clock at Vindolanda', *Current Archaeology* 228 (2009), 12–17; Bonnin (n. 31), 36; A. Meyer, 'Notes on the Vindolanda "calendar": related artefacts and the purpose of the Vindolanda fragment', in R. Collins and F. McIntosh (edd.), *Life in the Limes. Studies of the People and Objects of the Roman Frontiers* (Oxford, 2014), 109–15.

[36] Lewis (n. 35), 16–17; Bonnin (n. 31), 35 and id., (n. 6), 270 (A_338).

[37] Meyer (n. 35), 109–10.

[38] Bonnin (n. 31), 35–7.

[39] Remijsen (n. 28), 135–6.

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In at least two cases we have a *horologium* mentioned in a military context, and in another four cases the soldier who can be assumed to be responsible for building and looking after the official clock—the *horologiarius*.

The first example qualifies as circumstantial evidence. It is a sundial discovered in Siʿâ (Syria), with an inscription that mentions its owners/builders, two legionaries of *VIII Augusta*, one of them ranking as κούστως Σεία.[40]

The second example is more closely related to the issue, *CIL* 13.7800 (= *AE* 1977.154), from Rigomagus in Lower Germany:

[--- Diadumeniano]
nobil[issimo Caesari]
sub C[lau(dio)] M[arcio Agrippa(?)]
leg(ato) Au[g(usti) p]r(o) pr(aetore) pr(ouinciae) agens Pe
tronius Athenodorus prae[f(ectus)]
coh(ortis) I Fl(auiae) **horolegium** [*sic!*] ab ho
ris intermissum et uetus
tate co(n)labsum [*sic!*] suis inpendi(i)s
restituit [[Imp(eratore) d(omino) n(ostro) Macrino Aug(usto) II co(n)s(ule)]]

'… Diadumenianus, noble Caesar and Cl. Marcius Agrippa, governor of the province, with Petronius Athenodorus, prefect of the cohort I Flavia, acting as agent, have reconstructed, on their own expense, the (official) clock (of the fort), malfunctioning and collapsed owing to old age, in the year when our Lord, the Emperor Macrinus Augustus, was consul for the second time.'

This is an obvious case of a repair of an official fort clock, paid by the prefect of *cohors I Flauia*, after it deteriorated owing to its old age, dated A.D. 218. It is an official attestation of the presence and usage of such equipment in the military environment. The official character of the endeavour is evident from the dedication to the Caesar Diadumenianus and the patronage of the provincial governor, as well as its placement inside the *principia*.[41] On this evidence, the presence of an official sundial (*Lageruhr*) of the fortress has been presumed, which could have been placed on the front of the *principia*, facing the *uia principalis*.[42]

4. THE *HOROLOGIARIVS*

As far as the *horologiarius* is concerned, the matter exercised the attention of scholars for a long time. Von Domaszewski acknowledges the existence of the rank/function in the military, in two different instances, first using as evidence *CIL* 3.1070, from

[40] M. Dunand, *Mission archéologique au Djebel Druze. Le Musée de Soueïda. Inscriptions et monuments figurés* (*Bibliothèque Archéologique et Historique* 20) (Paris, 1934), 77 n. 162 (fig. XXXIII); AE 1936.147; Bonnin (n. 6), 270.

[41] See M. Horster, *Bauinschriften römischer Kaiser. Untersuchungen zu Inschriftenpraxis und Bautätigkeit in Städten des westlichen Imperium Romanum in der Zeit des Prinzipats* (Stuttgart, 2001), 188–207.

[42] H. von Petrikovits, *Die Innenbauten römischer Legionslager während der Prinzipatszeit* (Opladen, 1975), 75 and n. 79; A. Johnson, *Römische Kastelle: des 1. und 2. Jahrhunderts n. Chr. in Britannien und in den germanischen Provinzen des Römerreiches* (Mainz, 1987), 124–5.

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Apulum,[43] second using as circumstantial evidence *CIL* 13.7800, from Rigomagus.[44] Connecting the evidence from Apulum to the religion of the Roman army, he argues that this dedication is related to the cult of the buildings inside the fort, in this case suggesting that the building has a sacred character, as the sanctuary of the official clock of the fortress.[45] Later, in *Rangordnung*, he would state that the *horologiarius* is a rank equivalent to the *principales* of the legion, attending to the official clock of the fortress,[46] sometimes presumably also signalling to the horn-blowers the time to announce the change of guard.[47]

Even if evidence is scarce for this function, there are at least three epigraphic examples coming from Rome that can be related to it, all connected to the *uigiles*.[48]

The first example is a construction plate dated to A.D. 113, inaugurating an aedicule, mentioning the commanding officers of the *uigiles* and a series of twelve *principales*, belonging to the same *centuria*. The men are part of the *centuria* of C. Iulius Rufus and occupy the following functions: *beneficiarius subpraefecti*, *beneficiarius tribuni*, *uexillarius*, two *optiones*, two *secutores tribuni*, *tesserarius*, two *librarii*, *bucinator* and the peculiar *HOR LEG* C. Peturcius Pudens. This last function has always been considered as an abbreviation for *horrearius legionis*,[49] even if this is not probable for two reasons: the role has no place within the *uigiles*, in a *centuria*, between two *secutores*; second, the function is not attested elsewhere in the army.[50] Moreover, the *horrearii* are attested exclusively in the civil environment and in the central administration in Rome, and are, in their vast majority, slaves[51] or freedmen. This is not to say that the army had no *horrea*, or no soldiers attending to them, simply that no military *horrearii* are attested.

It is perhaps preferable to presume either a misspelling by the stonemason, who meant to inscribe *HORLOG*, which, if acceptable, would lead us to the more obvious development of *hor(o)log(iarius)*, the *principalis* associated with the building and maintenance of the official clock in the fort, or to *hor(ologiarius) leg(ionis)*, but then we cannot explain his involvement with the *uigiles*. The first option is more plausible also because the same misspelling is noticeable in *CIL* 13.7800, mentioned earlier, with *horolegium* instead of *horologium*. From this association, we can assume that all the military camps had at least one official water clock, but perhaps not all units had a non-commissioned officer in charge of its construction and maintenance. The duty of reading and announcing key moments throughout the day may have been available to any member of the military.[52]

[43] von Domaszewski (n. 4 [1895]), 103.
[44] von Domaszewski (n. 4 [1908]), 46.
[45] von Domaszewski (n. 4 [1895]), 103. Worshipped in the same way as the *aedes principiorum*, the clock and the standards could moreover have shared the same space.
[46] von Domaszewski (n. 4 [1908]), 46.
[47] Y. Le Bohec, *L'armée romaine sous le Haut-Empire* (Paris, 1989), 52. However, there is no ancient evidence for this.
[48] *CIL* 6.221, 1057 and 1058.
[49] von Domaszewski (n. 4 [1908]), 46, 14; P.K. Baillie-Reynolds, *The Vigiles of Imperial Rome* (London, 1926), 88. Dessau, however, doubts this assumption: *ILS* 2160 (*dubitans proposuit Henzen*).
[50] R. Sablayrolles, *Libertinus miles. Les cohortes de vigiles* (*Collections de l'École Française de Rome* 224) (Rome, 1996), 232–3. Only a *genius horrei* is mentioned in connection with the military *horrea*.
[51] Called precisely *seruus* in *CIL* 6.682, 8682; *AE* 1992.3723 or *actor* in *CIL* 6.9108.
[52] Perhaps not at every hour, but at least for the change of the night guards, the horn-blowers would be asked to mark the ending and the beginning of each *uigiliae*. See Veg. *Mil.* 3.8.16–18.

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The other two inscriptions that can be considered as evidence for the *horologiarius* are the lists of *cohors V uigilum*, from A.D. 205 and 210 containing all their officers and soldiers.[53] One particular individual is of concern to us, M. Ulpius Irenaeus, present in both of the lists, with a supplemental designation as *HO* in A.D. 205 and *HC* in A.D. 210. As in the case of C. Peturcius Pudens from *CIL* 6.221, *HC* has been understood several times as *h(orrearius)*, this time *c(ohortis)*,[54] but the actual succession of letters is, in both cases, *H* followed by a reversed *7* (the centurion sign).[55] Such an equation to *horrearius cohortis* is never heard of before; therefore, by analogy to *CIL* 6.221, we could consider Irenaeus also a *h(orologiarius) 7(centuriae)*.[56]

There is, however, more to be said regarding Irenaeus. In the five-year span between the two lists, his career does not change in any way. In A.D. 205 he is part of the second *centuria*, of Aelius Torquatus, the eighty-seventh on the list and by A.D. 210 he remains in the same second *centuria*, now having a different centurion, Rufinus, mentioned fourth on the list. The interesting fact is that only Irenaeus remains in the same position for at least five years. His centurion is promoted or transferred, and the vast majority of his colleagues are no longer with him by A.D. 210. In fact, only forty-seven soldiers are to be found in the same second *centuria* over the five years, and only one has been promoted to *codicillarius* in this period, from a grand total of 167 (A.D. 205) and 140 (A.D. 210). We can assume that the man was rather unique and useful in his function, that of clock-making and maintenance, such specialists being in fact difficult to find. Placed by these three soldier-lists in the ranks of *principales*, indicative of an increase in pay, we would assume naturally that he is considered a technical *immunis*. Perhaps the solution for the identification of his position is related to the complex matter of the military *medici*, *architecti*, *mensores*, *libratores* or other categories of civilians contracted in the army, considering also his Greek origin, common to technicians and specialists.[57] On the other hand, whereas in a military camp the medical and architectural technicians were more or less constantly engaged in matters that required their technical competence, new clocks would only occasionally be required, but building them needed an in-depth astronomical qualification.

One of the most significant pieces of epigraphic evidence in this regard is the previously mentioned inscription from Apulum. In the first place, it had a tumultuous history. On the one hand, M. Ulpius Mucianus was considered to be a *horologiarius* only by von Domaszewski and later by von Petrikovits and Le Bohec,[58] while Dessau remained undecided,[59] but

[53] *CIL* 6.1057 and 1058.
[54] von Domaszewski (n. 4 [1908]), 14; Baillie-Reynolds (n. 49), 88.
[55] Sablayrolles (n. 50), 232.
[56] Sablayrolles (n. 50), 233.
[57] See R.W. Davies, 'The *medici* of the Roman armed forces', *Epigraphische Studien* 8 (1969), 83–99; id., 'The Roman military medical service', *Saalbuch Jahrbuch* 27 (1970), 84–104; O. Stoll, '*Ordinatus architectus.* Römische Militärarchitekten und ihre Bedeutung für den Technologietransfer', *MAVORS* 13 (2001), 300–68; id., '*Medicus centurio* (PSI 1063). Ein Sanitätsoffizier mit taktischem Kommando? Probleme, Hypothesen, Lösungen', *Jahrbuch des römisch-germanischen Zentralmuseums Mainz* 50 (2003), 329–54 and P.A. Baker, *Medical Care for the Roman Army on the Rhine, Danube and British Frontiers in the First, Second and Early Third Centuries A.D.* (*BAR IntS* 1286) (Oxford, 2004).
[58] See above, von Domaszewski (n. 4 [1908]), 46; von Petrikovits (n. 42), 75 and n. 79; Le Bohec (n. 47), 52, and id., *Die römische Armee* (Stuttgart, 1993), 55.
[59] In *ILS* III.2 (page 732) he agrees that *horologiarius* is *inter officia militaria*, and refers to page 489, where the text of the inscription of Apulum is given, with no solution for the term *horologiar*.

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consequently the character's fate changed. The inscription was discussed in several papers with different purposes, published across twenty years, all of them reaching the consensus that Mucianus was not a *horologiarius*, but that he erected a *horologiarium templum*, a sanctuary enclosing or serving as a clock.[60] As mentioned above, the *horologia* were mostly adjacent or part of larger monuments or buildings, but there is no mention of a temple with a clock in this manner of topic, only as *horologium cum* … .[61] Very recently, the inscription has been reconsidered by Bonnin, who seriously doubts the solution regarding a temple provided with a *horologium*, especially considering the ὡρολογιά[ριος] of Nikaia.[62]

The two examples mentioned above, from Nikaia, Bithynia and Pontus,[63] especially the example transliterating the actual Latin term in Greek,[64] serve as precise analogies, even if they are discovered in civilian environment. They attest a function related to clock-building and maintenance—the *horologiarius*—that must have been, as in many other cases, contracted by the army.

Another matter is that of the dating, because the inscription is clearly dated to A.D. 212–217, but the consuls were in office in A.D. 193.[65] Probably the pledge was made in connection with the accession of Severus to emperor.[66] However, this is difficult to establish since the actual stone is gone and no assumptions can be made on the integrity of the texts and their belonging to the same inscription.

M. Ulpius Mucianus bears an obvious Thracian name and the origins of his citizenship go back to the reign of Emperor Trajan. He is a soldier of the legion *XIII Gemina*, in service. His status is clearly and continuously stated: *mil(es) leg(ionis) XIII Gem(inae) / horologiar(ius)*. We have no reason to assume that he was not a soldier with this rank, simply because a regular soldier of the legion could not have erected (*a solo de suo ex uoto fecit*) a temple of Jupiter and Juno.[67] In addition, this is the only abbreviation HOROLOGIAR known until now in Latin inscriptions, and can most feasibly be understood as *horologiarius*. Taking into account the Greek transliteration ὡρολογιά[ριος],[68] we have thus the perfect analogy. Not least, the *Oxford Latin Dictionary*[69] considers *horologiarius* an adjective, determining the presence of a *horologium* on/in a building, but the argument is supported by the misread of *CIL* 3.1070. The precise problem of this reading of the inscription is the association of this adjective to the noun *templum*, and for this we have no other epigraphic analogy, therefore leading to an understandable

[60] Mommsen in *CIL*; D. Tudor, 'Les constructions publiques de la Dacie romaine d'après les inscriptions', *Latomus* 23 (1964), 271–301, at 294; J. Fitz, *Honorific Titles of Roman Military Units in the 3rd Century* (Budapest and Bonn, 1983), 62; V. Moga, *Din istoria militară a Daciei romane. Legiunea XIII Gemina* (Cluj-Napoca, 1985), 42 and Piso (n. 3), 147–8. P. Forisek, 'Inscriptions of the Roman Dacia in the works of Tauriunus and Reicherstorffer', in G. Németh, I. Piso (edd.), *Epigraphica II. Mensa rotunda epigraphiae Dacicae Pannonicaeque. Papers of the 4th Hungarian Epigraphic Roundtable. 1st Rumanian-Hungarian Epigraphic Roundtable, Sarmizegetusa 2003* (Debrecen, 2004), 237–53, at 246–8 is undecided.

[61] See n. 15 above.

[62] Bonnin (n. 6), 268–9.

[63] See n. 22 above.

[64] *IGRR* III.1397.

[65] Falco was *consul ordinarius* in A.D. 193, allegedly plotted against Pertinax and was spared (SHA *Pert.* 10.1–7); therefore, he was likely to have left the consulship before the accession of Didius Iulianus and subsequently Severus. See further J. Champlin, 'Notes on the heirs of Commodus', *AJPh* 100 (1979), 288–306, at 300–5.

[66] *IDR* 3/5, 148.

[67] Acc. *IDR* 3/5, 148.

[68] See nn. 22 and 65 above.

[69] *OLD* s.v. *horologiarius*.

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vicious circle. Moreover, the rank of a soldier is described with a noun, in many instances mentioned after *miles legionis*.[70] The inscription seems to have an official character, mentioning the emperor and dated by consuls, meaning that it must have referred to a hydraulic clock, rather than to a sundial, which would have been easier to maintain.[71]

5. CONCLUSION

In the military, the need to keep good time has always been important. The Roman army needed such timekeeping devices in order to organize the working day, preparations for battles and sieges and most importantly the night watch. The only way in which this was possible was to have one or several official clocks in the fort, so that everyone could tell the time and conform to the schedule. Since all ancient clocks depend directly on geographic coordinates, latitude and longitude, it was necessary for each unit to have its own timekeeping instruments. Even if Caesar makes specific mention only of the use of a water clock in the army, we may assume the presence of such a facility in all permanent military installations. Its attestation, amongst other instances, in the legionary fortress of Apulum, in the vicinity of a provincial capital, simply points out to the importance of telling precise time in a military environment and also to the importance of the individual, probably the only such specialist with such expertise in the province, for which he was contracted and enlisted in the legion. However, telling the time was not a particular skill, therefore no special personnel were needed for this. For their construction, on the other hand, the specialist *horologiarii* were likely to be needed.

The inscription of Apulum, backed by the other epigraphic examples discussed above, seems to be the best evidence we possess on this particular function in the army. The *horologiarius* was probably not a simple clock attendant and reader, but his importance and specialization can also be connected with clock-building and maintenance. On the one hand, this skill was available only to those who had been initiated in astronomy,[72] people who were sought by civil or military communities in order to equip themselves with timekeeping devices. On the other hand, as we can notice from the example of Narbonensis,[73] the operation and administration of such a public work was entrusted to a lower category of people, perhaps to slaves.

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[70] *CIL* 3.12074; 5.6785; 8.18291; *AE* 1968.605: *miles leg. ... beneficiarius*. *ILS* 4510a: *miles leg. … signifer*. *CIL* 3.6108, 8201; 6.232, 3342, 3349, 3355, 3366; 10.1771: *miles leg. … frumentarius*. *CIL* 13.7943: *miles medicus*, etc.

[71] See also *CIL* 13.7800, Rigomagus, with Bonnin (n. 6), 269.

[72] See n. 21 above.

[73] See n. 19 above.

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