

# Roman nightlife

Autor(en): **Wilson, Andrew**

Objektyp: **Article**

Zeitschrift: **Entretiens sur l'Antiquité classique**

Band (Jahr): **64 (2018)**

PDF erstellt am: **14.09.2024**

Persistenter Link: <https://doi.org/10.5169/seals-816252>

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## II

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### ROMAN NIGHTLIFE

#### 1. Introduction

This paper discusses a combination of written and archaeological evidence for nocturnal activities in the Roman world. It considers methods of measuring the night, where the means of measuring time had to advance beyond the sundial: water clocks, and Ktesibios' improvements to them, are important here. Lighting is of course essential to many activities taking place at night, and the paper considers the effectiveness and limitations of available lighting technology — both in domestic settings, and in public. The humble oil lamp is a leitmotif in this paper, but we will also consider the rarity or otherwise of urban street lighting, and the infrastructure and organisation required for it.

Lighting in public places enabled other nocturnal activities, both routine and exceptional. Several inscriptions provide evidence for the opening of some public baths at night, and distributions of oil for gymnasia both night and day. Some festivals occurred at night, notably the *maiouma*, whose popularity spread in Late Antiquity.

Finally, the paper considers questions of the length of the productive working day, and the extent to which the availability of daylight neither did nor did not limit economic performance. This includes the evidence for night shifts and round-the-clock working — textual evidence for shift work in mines, iconographic evidence for milling by lamplight; nocturnal traffic in cities, and the question of 24-hour navigation at sea.

## 2. Measuring the night

The sundial was the obvious means of measuring the time during daylight hours, but equally obviously, did not work at night. (One of the earliest moonials is to be seen in the quad of Corpus Christi College, Oxford, dating to the 16<sup>th</sup> century.) The progress of the night could be measured by the stars, but this required complex astronomical knowledge. A revolution in measuring the night therefore came with the invention, in the 3<sup>rd</sup> century BC, of Ktesibios' water-clock.

Water-clocks were known from *c.* 1400 BC in Egypt, and were used in Classical Greece, for example to time speeches in Athenian lawcourts; they were outflow *klepsydrai*, consisting of a vessel with a stopper which emptied in a particular time.<sup>1</sup> But while they may have been useful for measuring a fixed unit of time, they were not precise over subdivisions of that unit, as the outflow rate varied, slowing down as the level of water in the vessel, and thus the head of pressure, dropped. Nor could they handle seasonal hours, which of course varied as the lengths of days and nights changed throughout the year. Around 270 BC, though, Ktesibios, working at Alexandria, developed a constant-head inflow clock. In this clock, water flowed *into* a container, and the inflow rate was kept constant by coming from a reservoir which was kept full; i.e. water flowed into the reservoir at a faster rate than from the reservoir into the clock, so that the level in the reservoir never dropped, and the surplus was disposed of via an overflow. As the water flowed into the clock, an ascending float drove a rack-and-pinion gear to mark the time on a vertical scale. The scale could be replaced by a cylinder with a graduated scale to reflect the different length of the hours at different seasons of the year.<sup>2</sup>

<sup>1</sup> LEWIS (2000) 361-362; HANNAH (2008) 752-753.

<sup>2</sup> VITR. *De arch.* 9, 8, 4-7, describing Ktesibios' clock; LEWIS (2000) 363-364.

A generation later, Archimedes invented an elaborate clock based on an outflow *klepsydra*. A description survives in the *Kitab Arshimadas fi 'amal al-binkamat*, *The Book of Archimedes on the Construction of Water Clocks*, an Arabic translation of a work probably by Philo of Byzantium, describing Archimedes' clock, with some later additions. The apparently original parts detail an outflow water clock, where the steady escape of water from a constant-head vessel lowers a float which unwinds a cord around a drum that drives various pieces of jackwork. These include the release of a bronze ball every hour into a metal vessel, making a clang; figures that descend or rise against the columns of the front of the clock, as they point to a graduated scale of hours; and other automata, including snakes that emerge from a cavern in a mountain and scare birds on a tree, who sing in alarm (this is done by forcing air to escape through a whistle or flute). Gears, tipping spoons that fill with water until they overbalance, are used to drive elements of the jackwork.<sup>3</sup>

In the 2<sup>nd</sup> century BC the invention of the anaphoric clock enabled a mechanised representation of the risings (*anaphorai*) of constellations which worked both by day and by night. A constant-head inflow *klepsydra* with an ascending float linked via a cord around an axle to a counterweight equal to the float caused the axle to rotate once every 24 hours, turning a bronze disc engraved with a map of the constellations in stereographic projection. On the disc a circle of 365 holes (or a fraction of that number) marked the ecliptic, or path of the sun across the constellations; a peg inserted into one of the holes marked the sun's position on that day, and had to be moved manually each day. In front of the disc an arrangement of bronze rods or wires marked the curved lines of the hours, the equator and the tropics, and the horizon. The anaphoric clock thus represented the turning heavens, with automatic seasonal adjustments, requiring only the manual advancing of the peg by one hole

<sup>3</sup> HILL (1976); LEWIS (2000) 364-366.



each day.<sup>4</sup> The clock in the Tower of the Winds at Athens (c. 50 BC) was probably an anaphoric clock, and fragments of bronze discs from anaphoric clocks have been found at Salzburg (c. AD 170) and Grand in Lorraine (2<sup>nd</sup> century AD).<sup>5</sup>

We see perhaps a development of this idea with Varro's description of his aviary at Casinum (*De re rustica* 3, iv. 2, 8-17):

“Beneath the interior of the dome, the stars Lucifer by day and Hesperus by night revolve and move about the lower part of the hemisphere, in such a manner as to show the time of day. In the middle of this same hemisphere there is a compass of eight winds, just as there is in the clock-tower at Athens built by the man of Cyrrhus: a hand extends from the axis to the circumference, and is moved so as to touch that wind which is blowing at the time, in such a manner that you can tell it when you are inside.” (trans. van Buren and Kennedy [1919])

The revolving dome was very probably driven by water-power, at a constant rate maintained perhaps by a large version of a constant-head *klepsydra*; and the design perhaps anticipates Nero's rotating dining room which stood in the same tradition. Hellenistic and Roman mechanical automata were not mere toys: they elaborated, developed and illustrated mechanical principles. Their development was closely related to the jack-work of clocks such as Archimedes' clock, and planetaria.

Of course, the elaborate clocks were limited largely to the elite, and sometimes also to the public, sphere. For many ordinary people, the night continued to be measured (if they were awake) by natural phenomena; the stars, and birds and roosters heralding the dawn. This is exemplified by the New Testament narratives of the crucifixion, of Jesus telling Peter he will deny him thrice before cock-crow (dawn).<sup>6</sup>

<sup>4</sup> VITR. *De arch.* 9, 8, 8-15; LEWIS (2000) 366.

<sup>5</sup> LEWIS (2000) 366-367.

<sup>6</sup> MATTHEW 26: 34; MARK 14: 30; LUKE 22: 34; JOHN 13: 38.

### 3. The night is dark, and full of terrors

In a brightly lit and highly urbanised modern world, with copious light pollution even in the countryside, we can easily forget how dark and terrifying ancient cities could be at night. The night was the province of robbers and miscreants, and the dangers and terrors of the night were a stock theme in ancient literature. At the start of Plautus' *Amphitryon*, Sosius is sent on a night errand by his master Amphitryon, just landed in harbour, to tell his wife he is home. Sosius is worried about being attacked, or arrested by the night watch. In *Elegy 3, 16*, Propertius, summoned by a letter from Cynthia at midnight to come from Rome to her at Tivoli, is wracked by anguish, weighing the (in his mind overwhelming) risk of being attacked and killed, against the prospect of sex, and of being dumped by her if he doesn't go. Unless you were a thief or an assassin, the night was usually not your friend. What could be done about it?

### 4. Light up the night

The obvious answer is of course artificial lighting. Oil lamps had existed in the ancient Near East, the early ones, Canaanite or Phoenician lamps, being saucer-shaped with a pinched wick-holder, developing apparently from an earlier use of tridachna and scallop shells as lamps.<sup>7</sup> It was the Greeks who reduced the risk of spilling oil when carrying the lamp about by making lamps with a closed reservoir and nozzle for the wick, and sometimes a handle at the back. Roman lamps continued this basic design — closed reservoir, nozzle, and handle as standard —, adding decorative motifs on the discus (top of the reservoir), and sometimes including a reflector at the back to cast

<sup>7</sup> TOUTAIN (1904) 1321; ROBINS (1939) 39-49; FORBES (1966) 142-144.

more light.<sup>8</sup> The decoration ranged from the erotic to the religious (both pagan and, later, Christian), through every conceivable walk of life between — gladiatorial scenes, animals, artisanal activities — and might even extend to playful shapes for the lamp itself: animals, birds, a snail, a sandaled foot, or even a Priapic statuette with the phallus as nozzle.<sup>9</sup> Wicks were made of fibrous material such as linen, papyrus, or plant fibres.<sup>10</sup>

Ceramic oil lamps are ubiquitous in assemblages from Greek and Roman sites, and were clearly the most common form of domestic lighting. A small ordinary lamp will provide enough light to illuminate a fair-sized room at least for the purposes of socialising — as experiments using a Hellenistic lamp excavated at Euesperides (Benghazi), with modern Cyrenaican olive oil as the fuel, demonstrated. A single lamp was enough to light (not brightly) the excavation dining room, seating twelve people, although for an organised social gathering one would prefer to have several lamps. Some dual-nozzle lamps allow twice the light from a single source (consuming, of course, twice as much oil); and multiple-nozzle lamps are also known, some Roman examples with up to twenty nozzles.<sup>11</sup> Some lamps — and especially multiple-nozzle lamps — had suspension loops to allow them to be hung from the rafters, and used as a fixed ceiling light rather than a portable lamp. Three suspension loops are the usual number found, the minimum needed to ensure that the lamp hangs level. Lamps were also made in

<sup>8</sup> TOUTAIN (1904); ROBINS (1939) 50-69; CHRZANOVSKI (2015).

<sup>9</sup> TOUTAIN (1904) 1325; ROBINS (1939) 58-59; BAILEY (1975); (1980a); (1988); phallic statuette: PERLZWEIG (1963) fig. 71.

<sup>10</sup> TOUTAIN (1904) 1322.

<sup>11</sup> Twenty nozzles, lamp in the shape of a ship: BAILEY (1980b) Q 2722, c. AD 70-120. 16 nozzles: TOUTAIN (1904) 1324, fig. 4580. For other multi-nozzle examples see TOUTAIN (1904) figs 4579 and 4593; BAILEY (1980a) Q1121-1123; (five and seven nozzles; 1<sup>st</sup> and 2<sup>nd</sup> centuries AD). Multiple-nozzle lamps go back at least to the Hellenistic period: 3<sup>rd</sup>-c. BC lamp with nine nozzles from the Athenian agora: PERLZWEIG (1963) fig. 17. BAILEY (1975) lamps Q 292-294, 2<sup>nd</sup>-c. BC lamps with twelve nozzles from sanctuary of Demeter at Cnidus. MART. *Epigr.* 14, 41 refers to a multi-nozzle lamp, a *lucerna polymyxos*, lighting an entire banquet.

bronze, often slightly larger than the ceramic lamps, so they would burn for longer, and their reflectors might have reflected more light than the ceramic ones. Again, double and multiple-nozzle bronze lamps, with suspension rings, are known.<sup>12</sup>

Our impression that the oil lamp was the most common lighting device is based to a large extent on the widespread survival of ceramic lamps, and to a lesser extent on the survival of bronze lamps, found in the archaeological record. There is some potential for evidence bias here, although frequent references in ancient literature to lamps — e.g. the *conscia lucerna* (“knowing lamp”) as a witness of what lovers get up to together<sup>13</sup> — suggest that the humble oil lamp was the default mode of domestic lighting. This impression is reinforced by the episode in Lucian’s *True History* (1, 29), in which the narrator, on his way back from the Moon, stops at the Planet of the Lamps, inhabited by anthropomorphised versions of the Platonic archetypes of lamps on earth, and even meets his own household lamp walking around. But why just one household lamp? This is a mystery. Moreover, we should not forget that the Roman world knew other sources of lighting too, principally candles, and torches. Torches, long wooden sticks with a rag around the end dipped in pitch, or sulphur mixed with lime, were a common form of lighting, used in nocturnal processions, or fixed in brackets or sconces indoors. They leave little archaeological trace, but have however been found in recent excavations in several of the galleries of the 2<sup>nd</sup>-century AD gold mine at Roşia Montană in Romania, in the form of wooden laths with one end burned.<sup>14</sup>

In the mid-4<sup>th</sup> century, the invention of glass lamps, cone-shaped, goblet-formed, or bowls of glass that could be suspended from ceilings or hooks, and shed light downwards as well as upwards and sideways, enabled a more efficient form of lighting,

<sup>12</sup> For metal lamps, BAILEY (1996).

<sup>13</sup> MART. *Epigr.* 14, 39.

<sup>14</sup> CAUQUET / TAMAS (2012) 226.

as is well discussed by Leslie Dossey in her contribution to this volume; they were used both in churches and for public street lighting in Late Antique cities.<sup>15</sup>

Candles were made of tallow or wax rolled in papyrus, with a reed wick; Martial in the late 1<sup>st</sup> century AD mentions both tallow and wax candles.<sup>16</sup> Constantine is said to have used beeswax candles for church services, transforming night into day with “pillars of wax” (Eusebius, *Vita Constantini* 4, 22); he was merely using a widely available technology, as Eusebius also describes his rival Licinius lighting wax candles to pagan idols. Again, direct archaeological material is scarce, but a 5<sup>th</sup>- or 6<sup>th</sup>-century candle-holder from the northern Black Sea region indicates their use there in Late Antiquity. The Jewish menorah, often referred to as a seven-branched “candlestick”, and the *hanukkiyah*, its nine-branched counterpart used for celebrating the feast of Hanukkah, originally burned olive oil in metal cups at the top of the holders, and not candles; the originals were thus a descendant of the Canaanite open-saucer lamps, and menorahs or menorah iconography do not necessarily imply the use of candles in them.<sup>17</sup>

Artificial lighting was not confined to indoors. By the 4<sup>th</sup> century AD there is good evidence for some public street lighting in the major cities of the eastern empire — Antioch, Ephesus, Alexandria, and perhaps others. How far back this phenomenon can be retrojected before the 4<sup>th</sup> century is unclear. The famous passage of Tacitus’ *Annals* about Nero burning Christians as human torches, as scapegoats for the fire at Rome in AD 64, which is sometimes adduced as an early form of street lighting, actually locates the event in Nero’s gardens, apparently as a spectacle for the crowd:

<sup>15</sup> DOSSEY (this volume); see also O’HEA (2008), who focuses’ chiefly on their use in churches. Cf. ROBINS (1939) 75-77.

<sup>16</sup> ROBINS (1939) 16; FORBES (1966) 134-142; O’HEA (2008). MART. *Epigr.* 14, 40 — a candle, evidently not wax, since *Epigr.* 14, 42 explicitly describes a wax candle.

<sup>17</sup> ROBINS (1939) 80-81.

“First, then, the confessed members of the sect were arrested; next, on their disclosures, vast numbers were convicted, not so much on the count of arson as for hatred of the human race. And derision accompanied their end: they were covered with wild beasts’ skins and torn to death by dogs; or they were fastened on crosses, and, when daylight failed were burned to serve as lamps by night. Nero had offered his Gardens for the spectacle, and gave an exhibition in his Circus, mixing with the crowd in the habit of a charioteer, or mounted on his car. Hence, in spite of a guilt which had earned the most exemplary punishment, there arose a sentiment of pity, due to the impression that they were being sacrificed not for the welfare of the state but to the ferocity of a single man.”

(*Annals* 15, 44, 2-5; Loeb trans. J. Jackson)

We encounter hard evidence of street lighting as more than an occasional phenomenon only from the 4<sup>th</sup> century onwards, in the larger and more important cities of the eastern empire. It is unclear whether that is because the phenomenon only really developed in Late Antiquity (which is generally the default assumption), or because we have more lawcodes and sources describing daily civic life from this period. At Ephesus an inscription on the wide colonnaded street from the harbour to the theatre, known as the Arkadiane, refers to street lighting, with fifty lamps in the two colonnades.<sup>18</sup> Street lighting is also attested at Antioch and Alexandria, and, in the 5<sup>th</sup> century, at Constantinople.<sup>19</sup> Leslie Dossey insightfully observes, in her chapter in this volume, that the development of glass lamps, which would not only shed light downwards would have provided a better means of outdoor lighting; she is surely right to connect this with the spread of Late Antique street lighting. Indeed, glass lamps would also shield the flame from the wind, and thus enable a more reliable form of outdoor illumination. The development of glass hanging lamps therefore provides an attractive technological explanation for why street lighting

<sup>18</sup> *I.Ephesos* 557; *I.Ephesos* 1939; GRÉGOIRE (1922); FOSS (1979) 56; FEISSEL (1999).

<sup>19</sup> FOSS (1979) 56.



appears to have become common only in Late Antiquity. Dossey argues that a shift to later evening hours in Late Antiquity meant a greater need for lighting, “bringing about change in both lighting technology (glass lamps) and people’s habits”. But one might in fact wonder whether it was in fact the invention of the glass hanging lamp, and its far greater efficiency as a lighting method for large public buildings (baths, churches) and spaces, and its greater reliability as an outdoor street lamp that *enabled* the shift to later hours.

Ammianus Marcellinus (14, 1, 9), writing about events at Antioch between AD 351 and 354, mentions street lighting in the context of Gallus Caesar’s nocturnal inquiries about public opinion about himself:

“taking with him a few followers secretly armed, he [Gallus] used to rove in the evening through the streets and among the shops, making inquiries in the Greek language, in which he was well skilled, what were the feelings of individuals towards Caesar. And he used to do this boldly in the city, where the brilliancy of the lamps at night often equalled the light of day.” (trans. Yonge [1862]).<sup>20</sup>

Libanius gives us more detail on the street lighting at Antioch, stressing that “night differs from day only in the kind of light” — the same activities, whether for work or leisure, go on by night and by day (*Or.* 11, 267; AD 360):

“Here he [Sleep] is not ‘lord of men’, neither does he draw men to himself against their will, or lull them to rest by force, but we alone of all people have shaken off his tyranny over our eyelids, and to the torch of the sun there succeeded other torches which surpass the festival of the lamps in Egypt, and among us night differs from day only in the kind of the light. Night is the same as day for the handicrafts, and some work vigorously while others laugh gently and give themselves up to song. The night is

<sup>20</sup> *adhibitibus paucis clam ferro succinctis uesperis per tabernas palabatur et com-pita, quaeritando Greco sermone, cujus erat impendio gnarus, quid de Caesare quisque sentiret. Et haec confidenter agebat in urbe, ubi pernoctantium luminum claritudo dierum solet imitari fulgorem.*

shared indeed by Hephaestus and Aphrodite, for some work at the forge and others dance; but in other cities Endymion is more honoured.” (trans. Downey [1959] 681)

Yet of course that oration is a speech in praise of Antioch, and elsewhere Libanius assumes a different viewpoint to suit a different argument — three years later, in a speech urging civic humility to curb the emperor Julian’s anger against the city, he advises reducing the amount of street lighting (*Or.* 16, 41; March AD 363):

“This extravagant lighting, this indication of idle luxury that hangs over the entrances to our baths — let us make it a fraction of what it now.” (trans. Loeb)

And in another speech, in AD 386, against the governor Tisamenos, he singles out the cost of Tisamenos’ initiative to treble the amount of street lighting, which falls on the shopkeepers who are supposed to keep lamps burning outside their shops or workshops (*ergastêria*) at night (presumably, if we follow Dossey, three times as many glass lamps rather than triple-nozzle ceramic or metal lamps instead of single-nozzle lamps?). He imagines the protests of the shopkeepers at having to provide three times as much olive oil, and says (*Or.* 33, 33-38):

“Yet why all this eagerness on this point, for so much lighting in the city while it sleeps? No good results from it for the sleeping populace, and the lighting that existed before was good enough for the watch. You can’t tell me that there has been any decrease in the number of criminals now, or that there were more of them previously. All this business reeks of drunken insolence and disregard of the folk who live in poverty.” (trans. Loeb, adapted)

Political orator that he was, Libanius contradicts himself again in a speech the following year, where this time he does seem to value the street lighting, and implies that its removal contributes to disorder (*Or.* 22, 6; AD 387). Speaking of rioters protesting against a tax levy to fund celebrations for the emperor’s 10<sup>th</sup> anniversary, he says:



“They proceeded to the bath nearby, and used their knives to cut the ropes, from which were suspended the lamps that give us our light of a night time, and they made it plain that good order in the city must give place to their own whims, and that their decisions were the ones to count.” (trans. Loeb)

As with any politician picking a topic for rhetorical advantage, it is difficult to say what Libanius truly believed about the benefits or the extravagance of street lighting at Antioch, but we may establish the following conclusions: (1) Antioch had a street lighting programme that was unusual at the time, and made it an object of civic pride; (2) the oil, if not the lamps, was paid for/provided by shopkeepers who were responsible for keeping lamps lit outside their shops; and this might be enforced by the city night watch; (3) lamps were also provided in or outside the public baths, and these at least were hanging lamps; (4) there was some public perception that the presence of street lighting (if not its intensity) reduced nocturnal crime.

The inhabitants of Alexandria referred to other cities as “lampless”, inferior to their own, indicating that they had, and were proud of, their street lighting; but that it was not a universal phenomenon.<sup>21</sup> St Basil of Caesarea seems to imply that Caesarea had had street lighting at one point: in *Epistle 75*, bemoaning the state of Caesarea *c.* AD 371, he says “Our distress prevents our paying any attention to locked gymnasia and lampless nights” — the gymnasia (baths) are closed and the lamps cannot be lit because of the lack of publically financed oil.<sup>22</sup> At Constantinople, *c.* AD 440, the prefect Cyrus, “contrived for the evening lamps to be lit in the shops, and likewise the night-time lamps”.<sup>23</sup> Clive Foss sees this as referring to the introduction of street lighting,<sup>24</sup> but as we shall shortly see, since at least AD 424 the Baths of Zeuxippus had been lit at night, and Cyrus may have been extending a scheme that had

<sup>21</sup> FOSS (1979) 56.

<sup>22</sup> BASIL. *Ep.* 75, 2; REMIJSEN (2015) 265, n. 52.

<sup>23</sup> PRISCUS fr. 3a, *FGH* iv.73 = *Chronicon Paschale* 588.

<sup>24</sup> FOSS (1979) 56.

originally applied to the public baths, or to parts of the city only. The main obstacle to be overcome was presumably the cost of the oil. While at Antioch, as we have seen, shopkeepers had to provide lighting outside their shops and pay for or provide the oil consumed, in some other cities, the oil may have been provided not as a contribution in kind but out of municipal funds, since (according to Procopius) after Justinian confiscated municipal revenues, “the public lamps were not kept burning in the cities”.<sup>25</sup> This implies that by the 6<sup>th</sup> century street lighting was widespread in the Byzantine world.

We may perhaps flesh out this picture of these major Late Antique cities — Constantinople, Alexandria, Antioch, and Ephesus, and apparently also Caesarea — having street lighting with some archaeological evidence from Asia Minor. This comes from a colonnaded portico at Aphrodisias, and is a tentative suggestion. Several of the columns of the north portico of the so-called South Agora (in fact, not an agora at all, but “The Place of Palms”, an urban park with a large ornamental pool and a palm grove) have holes cut in them in Late Antiquity for hooks or brackets (Fig. 2.1). These were of iron, as rust staining within the holes shows. They face the open space of the park, and are located at heights from 1.55-1.64 m above the stylobate, but rather higher therefore than the original ground level of the park, and of the seat running along the portico just below the stylobate, which forms a step up to the stylobate from the ground level of the park. Lamps hanging from hooks, or set on a metal bracket, would have been a little above eye level, and at a convenient height for filling without having to lower the lamp with an arrangement of ropes and pulleys. The holes for the iron fittings (hooks or brackets) are associated with personal names inscribed just above them, and lamps hung from hooks or set on brackets here would also have illuminated the names. Might we imagine a situation where stallholders trading from within the portico in Late Antiquity

<sup>25</sup> PROC. *Arc.* 26, 6-7; FOSS (1979) 56.

were also required to keep lamps lit outside their stall at night, to provide lighting in this park at the heart of the city? Other interpretations of the structural/archaeological evidence here may of course be possible, but this one is at least consistent with the evidence, and deserves, I think, some consideration in the context of an enquiry into Roman nightlife.

## 5. Night swimming

In fact, providing street lighting (after the development of glass lamps) is not conceptually or technically terribly different from providing lighting in the public baths for nocturnal bathing. Before the development of glass lamps, a large bronze lamp, from the Harbour Baths at Ephesus, shows how, for indoor lighting, the basic lamp design could be enlarged, multiplied, and put on a large stand to light a public building. In one of the passages of Libanius just quoted, the public lighting at the baths is the target for attack by rioters. Once glass lamps became widespread, the main challenge in providing ancient lighting at night lay not with the technology *per se*, but in ensuring that somebody would provide the oil and light the lamps. In the case of municipal street lighting, this was either devolved onto shopkeepers with properties on major colonnaded thoroughfares, as at Antioch, or, at some cities in the 6<sup>th</sup> century, apparently provided from municipal funds. Public baths were however a simpler proposition: whether run directly by the municipality, or operated by a contractor, the cost of lighting in nocturnal hours could be offset by the entrance fees charged for the baths. At the mining settlement of Vipasca (Aljustrel in Portugal), one of the early 2<sup>nd</sup>-century laws governing the assignation of monopolies at the settlement stipulates that the *conductor* of the baths is to keep the baths open from first light to the seventh hour of the day for women, and from the eighth hour of the day to the second hour of the night for men.<sup>26</sup> The baths must thus have been lit.

<sup>26</sup> *CIL* II 5181 = *An.Ép.* 2001, 1128 = *An.Ép.* 2013, 129.

At Rome, Alexander Severus is said to have donated oil for lighting the public baths at night, where previously they had not opened before dawn and had closed at sunset.<sup>27</sup> The emperor Tacitus reverted to the earlier closing hours to avoid disturbances or unrest at night.<sup>28</sup> At Constantinople, in AD 424, the baths of Zeuxippus were lit at night, the cost being covered from the revenues of the shops and workshops that had been built the portico of the baths.<sup>29</sup> It is probable that ancient street-lighting in the larger cities of the late antique eastern Mediterranean evolved from systems used to light the public baths at night in many cities, at an earlier date, but with the introduction of glass lamps enabling the transfer to outdoor lighting, as they would not be blown out by gusts of wind in the way that ceramic or metal oil lamps would.

Night swimming, or at least, cavorting around in water, appears also to have been a feature of the *maiouma* festival, originally an eastern water festival but which in the Roman west, at least, seems to have become conflated with the month of May (Maia). It incorporated torchlight processions and nocturnal theatrical performances recalling the mysteries of Dionysus and Aphrodite, following by banquets — in other words, the main themes were closely linked to drinking and eroticism, and the nocturnal nature of the celebrations will have assisted these elements. The festival became particularly popular in the 4<sup>th</sup> and early 5<sup>th</sup> centuries, spreading from its origin in Syria around the Roman Mediterranean. It had a

<sup>27</sup> *SHA*, *Alexander Severus* 24, 6.

<sup>28</sup> *SHA*, *Tacitus* 10.

<sup>29</sup> *Cod. Iust* 8, 11, 19 = *Cod. Theod.* 15, 1, 52: *Imp. Theodosius A. Seuerino praefecto urbi. quia plurimae domus cum officinis suis in porticibus Zeuxippi esse memorantur, redditus memoratorum locorum pro quantitate, quae placuit, ad praebenda luminaria et aedificia ac tecta reparanda regiae huius urbis lauacro sine aliqua iubemus excusatione conferri. dat. u id. ian. uictore u. c. cons. (424 ian. 9).* “The Emperor Theodosius, Augustus, to Severinus the Prefect of the City. Because there are said to be very many houses with their shops in the Portico of Zeuxippus, we order that the revenues from the aforesaid places, in the amounts fixed for them, be used for providing lighting, and for repairing the buildings and the roof of the hall of the baths of this city, without any exemptions (9 January 424).”

particular connection with water, and many theatres and odea were converted to host aquatic performances, by deepening and water-proofing the orchestra.<sup>30</sup> It was banned in the late 4<sup>th</sup> century because of its licentious nature, then the ban was lifted in 396 on condition that the festivals be conducted with decorum; they clearly were not, and the festival was banned again in 399 as a *foedum adque indecorum spectaculum* (“a foul and indecorous spectacle”), but apparently with little effect, as there are various references to the *maiouma* through the 5<sup>th</sup> century, and even as late as the eighth.<sup>31</sup> The early Church fathers got very exercised about it, and St John Chrysostom (*Homilia VII in Matthaëum*) raged against those who flock to watch lascivious performances of naked women swimming in the theatre when they should be going to church on Sundays. At Aphrodisias, the large 168-m long pool in the so-called “South Agora” appears to have been the locus for the *maiouma* festival there in late antiquity, as the governor Dulcitus, who restored the surrounding colonnades and buildings after an earthquake *c.* AD 500, is honoured in an inscription from the “South Agora” as *maioumarches*, leader of the *maiouma* festival.<sup>32</sup> We have already seen how the North Portico of the colonnades surrounding the pool has evidence possibly suggestive of provision for lighting, enabling us to imagine more clearly how a nocturnal festival in this palm-girt pool might look.

## 6. All night long

Effective illumination extended the useful hours of the day, and thus also allowed for extending the working day. We have seen how artificial illumination enabled night bathing and

<sup>30</sup> TRAVERSARI (1960) lists some 40 sites, but does not fully explore the relationship with the *maiouma* festival.

<sup>31</sup> See BELAYCHE (2004) 18.

<sup>32</sup> WILSON (2016).

festivals; but it also enabled longer working hours, or night working, and thus had an economic impact that could have permitted greater productivity per capita. There is evidence for round-the-clock working both by individuals and groups.

Most detailed evidence from working at night comes from writers talking about their own habits. Writing at night, or *lucubratio*, is portrayed as a lone activity, a hallmark of the studious scholar or literary author. References occur from Callimachus in the mid-3<sup>rd</sup> century BC onwards,<sup>33</sup> with a flurry in the 1<sup>st</sup> century AD: Seneca in AD 62 claims part of the night for his studies (*partem noctium studiis uindico*, *Ep.* 8, 1); and Pliny says that he wrote his *Natural History* in his spare time, that is at night (*subsiciuisque temporibus ... id est nocturnis*, *NH praef.* 18). In the 2<sup>nd</sup> century, Aulus Gellius entitled his work *Attic Nights* to reflect the fact that he had begun preparing it at night (*NA praef.* 4).<sup>34</sup>

Quintilian dilates at some length on the practice; he says that orators should develop fluency in their writing by working at night (*lucubratio*): you are not distracted by the view around you or from the window (*Inst.* 10, 3, 22-25); busy people have no alternative but to work at night (*occupatos in noctem necessitas agit*, 10, 3, 27). Distractions are fewer and concentration better: *ideoque lucubranti silentium noctis et clausum cubiculum et lumen unum uelut rectos maxime teneat* ("And so one should burn the midnight oil and let the silence of the night and a closed room and a single lamp especially hold one's eyes, as it were, free from swerving." 10, 3, 26; trans. Murgia, apud Ker 2004, 214). So long as we do not overtire ourselves, and give sleep its due place, nocturnal working gives the best kind of privacy (10, 3, 27).

The theme continues through antiquity; in the 4<sup>th</sup> century AD, Ausonius attempts a self-deprecating *captatio beneuolentiae* by opening his *Address to his Paper* by wondering if all his hard work late at night has been a complete waste of time:

<sup>33</sup> CALL. *Epigr.* 27, 4 Pfeiffer = 56, 4 Page; KER (2004) 227-228.

<sup>34</sup> See, on all this, KER (2004).



*ast ego damnosae nolo otio perdere Musae.  
iacturam somni quae parit atque olei.  
“utilius dormire fuit quam perdere somnum  
atque oleum.”*

“But I do not want to throw away the leisure devoted to the prodigal Muse who makes me waste sleep and oil. ‘It would have been more useful to sleep than to waste sleep and oil.’” (Ausonius, *Address to his Paper* 5-8; trans. McGill, adapted)

And that becomes the stereotype of the hard-working lone scholar. In late antiquity, if not before, it was extended to administrators and government officials; late antique provincial governors are described as “unsleeping”, “untiring”, and portrayed as drawn and unshaven, testimony to spending half the night attending to administrative business.<sup>35</sup>

Beyond the individual writer, or administrator, there is also plentiful evidence for working into the evenings, shift working, and round-the-clock working in a variety of walks of life. The most obvious, but also one of the most rhetorical, is a passage of Libanius that we have already encountered, in his speech in praise of Antioch:<sup>36</sup>

“among us night differs from day only in the kind of the light. Night is the same as day for the handicrafts, and some work vigorously while others laugh gently and give themselves up to song. The night is shared indeed by Hephaestus and Aphrodite, for some work at the forge and others dance.”

Libanius’ picture of craftsmen working at night may be foreshadowed by a milling relief from Rome, showing a pair of animal-driven mills working by lamplight.<sup>37</sup> One might perhaps object that this could simply show a mill in a windowless indoor environment, but the conventions of Roman iconography strongly suggest that a night-time scene is intended here.

<sup>35</sup> SMITH (1999) 183-188.

<sup>36</sup> LIBAN. *Or.* 11, 267.

<sup>37</sup> From the Vigna delle Tre Madonne, now in the Museo Chiaramonti in the Vatican: see WILSON / SCHÖRLE (2009) 115 fig. 17.

Night working was not confined to cities; it applied anywhere where artificial illumination could be provided. Pliny recounts the story of a small-holder, Chresimus, whose farm was so much more productive than his neighbours', and who was accused by his neighbours of using potions to move their crops onto his own property. When the case came to trial he

“brought all his agricultural implements into court (*instrumentum rusticum omne in forum attulit*) and produced his farm servants, sturdy people and also according to Piso's description well looked after and well clad (*adduxit familiam suam ualidam atque ... bene curatam ac uestitam*), his iron tools of excellent make, heavy mattocks, ponderous plough-shares, and well-fed oxen. Then he said: “These are my magic spells, citizens, and I am not able to exhibit to you or to produce in court my midnight labors and early risings and my sweat and toil’ (*beneficia mea, Quirites, haec sunt, nec possum uobis ostendere aut in forum adducere lucubrationes meas uigiliasque et sudores*).” (trans. Rackham)<sup>38</sup>

In mines, where the underground galleries needed illumination at any time of the day or night, it seems that round-the-clock working was natural; Pliny (*NH* 33, 70) refers to shifts measured out by lamps. Lamp-niches in mine galleries are found every few yards, and are almost a signature of Roman-period mining (Fig. 2.2); in a gallery at Roşia Montană in Romania a lump of clay with the impression of the base of a lamp shows how these lamps were kept in place,<sup>39</sup> as by lumps of blu-tac. Diodorus (3, 12, 6) refers to lamps mounted on miners' heads; one can see the advantages of this, but it is unclear how the risks of being scalded by hot oil were avoided. But night working was essential; when it came to pumping out water as one mined below the water table, nature is pitiless and does not respect daylight hours; de-watering of deep mine galleries had to be kept going by night and by day. This was usually accomplished by men either treading drainage wheels, or working Archimedes screws.

<sup>38</sup> PLIN. *NH* 18, 41-43; see KER (2004) 225-226.

<sup>39</sup> CAUQUET / TAMAS (2012) 230 fig. 5b.



Night working also extended of course to night driving and sailing, and indeed in the city of Rome, where Julius Caesar had forbidden most vehicles between sunlight and the tenth hour, deliveries by cart necessarily took place in the last two hours of daylight, and at night.<sup>40</sup> How the vehicles were illuminated we can only guess — torches rather than oil lamps would have given better light, and might be easier to mount in brackets on the cart or carriage, without the attendant problems of spilling the oil. In the *Life of St Andrew the Fool*, a hagiography of a fictitious saint, set in Constantinople in the reign of Leo (AD 457-474) but actually written either in the late 7<sup>th</sup> century or even the 10<sup>th</sup>, Andrew escapes from some drunken youths who have been abusing him, and falls asleep on a dunghill by the side of the street, where he is run over by a drunken carter driving along in the small hours of the morning.<sup>41</sup>

Navigation, both by sea and by river, might also have taken place on a 24-hour basis, unless prohibited by contract to reduce risk. Colin Adams notes that the export of Roman Egypt's grain harvest could involve a very intensive period of loading grain onto Nile river boats to get it to the ports of the Nile delta, particularly Alexandria, and that one 1<sup>st</sup>-century AD papyrus refers to the round-the-clock loading of ships.<sup>42</sup> That night sailing along the Nile was a not uncommon occurrence may be inferred from a shipping contract dated *c.* AD 63, from Oxyrhynchus, which engages one Anoubas son of Hermias to transport a cargo of 500 artabas of *arakos* (chickling vetch) from harbours in the Hermopolite Nome to Acanthon and Lile in the Oxyrhynchite Nome. Among the terms of the contract is the stipulation: "He is not to be permitted to sail by night nor (to weigh anchor) in foul weather (and?) he is to lay up daily at the safest harbours".<sup>43</sup> For sea-going ships, round-the-clock sailing

<sup>40</sup> Liv. 34, 1, 3; LAURENCE (2013).

<sup>41</sup> *Life of St Andrew the Fool*, ed. RYDÉN (1995); on the controversy about the date of the text, see CESARETTI (2016).

<sup>42</sup> SB XIV 11, 371; ADAMS (2017) 179.

<sup>43</sup> XLV 3250, translated and discussed by ADAMS (2017) 190-191.

was normal in the Roman period, with ships undertaking open-water voyages involving sailing at night, navigating by the stars; this was a distinct contrast from practice in the 7<sup>th</sup> and 8<sup>th</sup> centuries, where it was normal to sail along the coast and put into shore to lay up at night, before a resurgence of 24-hour sailing in the ninth century.<sup>44</sup>

## 7. Conclusions

Roman nightlife relied on technologies of artificial illumination. In themselves, they were simple, and were replicable and multipliable; to illuminate a larger area, or more brightly, one simply used more, and larger, oil lamps. They could be suspended, or mounted on brackets or stands. The main challenges to public lighting, indoors or outdoors, were organisational — who was going to pay for the oil, and organise the refilling of the lamps? In the case of public baths it seems to have been the contractors who organised this; while for public street lighting the problem was largely solved by a form of public taxation, falling chiefly on shopkeepers along the streets concerned, and may imply some after sunset opening hours of the shops concerned. Both public and private lighting had the effect of enabling longer working days, and thus potentially an increase in *per capita* production, as well as enabling a wide variety of leisure activities after sunset.

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## DISCUSSION

*I. Mylonopoulos:* A rather secondary remark concerning the first part of the paper and the measuring of the night: There is a rather recent monographic publication by a German archaeologist, Eva Winter, that deals with this subject and, in particular, its practical and material aspects.<sup>1</sup> And now the question. Do we know anything about the use of mirrors or other devices in closed spaces that could explicitly enhance (through reflection) the light offered by a lamp? Suetonius does speak of mirrors in Horace's bedroom.

*A. Wilson:* I am not aware of evidence that confirms that mirrors were deliberately used to enhance the light of a lamp, though of course they may have been and probably were. That the principle was clearly understood, at least, is evident from the use of ceramic and especially metal reflectors on lamps; a mirror, even more highly polished, would have served even better. A suggestion that mirrors were used in the ancient Egyptian turquoise mines at Serabit el-Khadim in the Sinai peninsula to reflect daylight into the mine galleries has been convincingly rebutted.<sup>2</sup>

*I. Mylonopoulos:* A rather detailed iconographic question about the *Vigna Tre Madonne* relief: there is indeed a lamp depicted on the milling relief, but I was wondering whether or not there is any evidence for flames shown — either in relief or painted — coming out of the nozzle of the lamp. The lamp does point to nocturnal use of the mill, but if there are no

<sup>1</sup> E. WINTER (2013), *Zeitzeichen. Zur Entwicklung und Verwendung antiker Zeitmesser* (Berlin).

<sup>2</sup> KNAUF (1988); BEIT-ARIEH (1990).

flames shown, then the actual narrative of the relief is probably not a nocturnal one.

*A. Wilson:* There is something above the nozzle of the lamp, which appears too thick to be the wick; it is damaged, but is quite possibly the base of the flame, the upper part of which is broken away.

*F. Carlà-Uhink:* You mentioned the *topos* of the sleepless and unshaved governor as a typical form of Late Antique praise of officials, and I would like to ask you two questions on this. On the one hand, I was wondering if you could explain in more detail what is the connection between sleeplessness and ‘unshavenness’, and whether the two aspects are ever explicitly mentioned together, maybe even in the form of a causal relationship, or if it is just a recurrent, simultaneous appearance. On the other hand, this *topos*, which is well attested epigraphically, is not always and not solely positive: in Procopius’ *Secret History*, for example, Justinian’s nights of work are definitely not meant to praise him as a careful and attentive governor. How do you combine the positive and the negative side of such descriptions of sleepless political men?

*A. Wilson:* The portrait sculptures of Late Antique governors, with their stubble, furrowed brows and drawn features, are well discussed by Bert Smith, who shows that they recall the stubble of the portraits of 3<sup>rd</sup>-century military emperors and are intended to evoke the sense of “being on service outside the capital — administration as *militia*”, without the time or leisure to shave. He notes that epigrams inscribed on the bases of such honorific portrait statues talk of “tireless work and unremitting labour”; and the inscription on a bust of a civic benefactor, Eutropius, at Ephesus, thanks him specifically for his sleepless labours.<sup>3</sup> The twin phenomena of stubble beards and tireless working far into the night clearly co-occur

<sup>3</sup> SMITH (1999) 183-185 and note 109 (Eutropius), 187.

to suggest a busy governor, the sleeplessness mentioned explicitly in the inscriptions, and the hard work suggested in the images through the stubble beards and lined brows.

As to the associations of sleeplessness, you can spin anything both ways, depending on how you contextualise it. Procopius (*Secret History* 12, 27) describes Justinian prowling around the Palace at all hours of the night — and not necessarily working; the associated comment that Justinian was devoted to the joys of Aphrodite is clearly indicated to hint to the reader what he might have been up to. By contrast, the Monastery of the Unsleeping (*Akoimêton*), with monks chanting prayers in shifts around the clock was clearly thought to be a good thing in the Christian world of 5<sup>th</sup>-century Constantinople. In the context of honorific statuary, the associations are evidently positive.

*A. Chaniotis:* This was a fascinating contribution with an abundance of evidence. And it is precisely the abundance of evidence especially about artificial light that I am concerned with. To what extent is the existence of evidence the result of the focus of archaeological research on certain types of settlements or of a historical development?

*A. Wilson:* It is a combination both of differential archaeological survival (rather than differential focus on different types of site, I think) and of historical development. We have far more evidence for ceramic lamps than for metal lamps, a result both of the greater affordability of ceramic lamps and of the propensity for metal lamps eventually to be melted down and recycled to make something else; we have less evidence for glass lamps than for ceramic lamps also because glass is less durable, and can be recycled. Of course we have almost no archaeological evidence for candles and torches again because of problems of material durability. So our evidence for different types of lighting, which may have different functional or social associations, is unequal. When it comes to literary evidence, of course, we are at the mercy of an anecdotal record — the occasional



sidelights on everyday life or practice that happen to occur in poetry, narrative political history, and the other mainstream genres of the literary canon. But despite an imperfectly distributed dataset, I think we can see from the sheer quantity and ubiquity of Roman ceramic lamps, compared to earlier periods, for example, that there was more artificial illumination in the Roman period than in the Classical Greek or Hellenistic periods (perhaps facilitated in part by a larger long-distance trade in olive oil).

*L. Dossey:* All of your evidence for government initiatives to set up street lighting in Roman cities comes from the late Roman period (and the eastern Mediterranean). Why don't you think we have clear evidence for public street lighting for 1<sup>st</sup>-century Rome? One would think Rome's very size and economic importance would have produced the need for it (and indeed the high density of lamps in the private shops and doorways of the much smaller city of Pompeii suggests that private initiative may have filled the void). How would you explain the absence of evidence for government-initiated street lighting in early imperial Rome?

*A. Wilson:* We assume that there was no street lighting at Rome in the 1<sup>st</sup> century BC and AD, as there is no positive evidence for it. If this assumption is accurate, as it probably is, one possible reason might be the lesser political will to provide such infrastructural services, and the lesser organisational capability of the late Republican state compared to the Roman imperial period. In the Republic, if anyone thought of providing street lighting, this is the kind of measure that would presumably have been proposed by the tribunes of the people (but we have no evidence that they actually did so). The upper classes had slaves who could light them along the streets, bearing torches, and may therefore have been less interested in providing lighting for everyone. Under autocratic rule, it perhaps became more important for the state (i.e. the emperor) to be



seen to be providing a range of services in return for taxation (and oppression). But on reflection I think that the argument in your own paper about the superior illumination provided by hanging glass lamps, and — I would argue — also their greater reliability in an outdoor context, may well be the key factor in precipitating the growth of street lighting in Late Antiquity.

*L. Dossey:* As a continuation of the previous question, your paper gives evidence from Latin sources for work — *ponos* — at night (suggesting a certain degree of colonization of the night by daytime activities). In addition to your example from Pliny the Elder, Columella discusses nightwork on farms by lamp-light; Apuleius nightwork at mills; Petronius night watchmen and messengers; and Cicero describes night carters in the early predawn. However, this is mostly night work among the lower social classes. Among the aristocracy, the work by lamplight (*lucubratio*) that you discuss (from Quintilian, for example) is private study in one's own cubiculum. My question is whether this association of *public* nightwork with the lower classes, and not the aristocracy, partly explains the absence of systematic street lighting in the early imperial period? Was it that the people who mattered in the Roman world didn't need it?

*A. Wilson:* Writing can be both *ponos* (toil) and leisure; in the case of Quintilian's advice to orators, he is talking about work rather than leisure. It is of course an affectation on Ausonius' part that he describes the writing he does in his *otium* in terms appropriate to *ponos*. The presentation by aristocratic writers of their own activity, and whether it is work or leisure, is often ambivalent and may vary according to the rhetorical effect they are trying to create. But arguably if the aristocracy didn't need outdoor lighting for work, they might have wanted it for leisure (going to the baths, or to dinner) — as you show that they in fact did in late antiquity. So I am not sure that this is the explanation; I like your emphasis on glass lamps better.

*A. Chaniotis:* There are certain activities that take place during the night without leaving much, if any, archaeological evidence. For instance, to judge from the Solonian regulation about funerals, a funeral should take place before sunrise but this is neither reflected in the iconography of the *ekphora* nor can it be deduced from archaeological finds, except perhaps for the deposition of lamps in graves. Could you comment on analogous phenomena that may influence the general picture that we draw about nocturnal activities?

*A. Wilson:* There is a difficulty in ancient iconography in depicting night-time scenes — vase paintings or sculptured reliefs can hardly convey a sense of dusk or night through colour, and so if a scene is depicted as being a night-time one it must be done through the depiction of lamps, torches, or the moon; and sometimes the composition does not allow for this. The problem with inferring activity at night from the finds of lamps lies in knowing whether the lamps have been deposited effectively in their usage context (if they are, they are more likely to be whole or at least fully reconstructable from fragments; although most whole lamps in fact come from burials where they have been deposited as grave offerings), or are residual material in some other deposit (construction fill, dump, etc.). In the latter case they merely reflect some kind of activity requiring light, probably nocturnal but possibly also in windowless spaces, somewhere on the site.

*K. De Temmerman:* I have a question regarding your argument about around-the-clock navigation. It reminds me of a passage in Heliodorus' *Aethiopica* (5, 17, 5) where nighttime sailing is explicitly presented as a safe alternative for (the more dangerous) docking at night: a ship at dusk lowers its sails so that it catches just enough speed to spend the entire night at sea and reach its destination at daybreak. Do we have any evidence on the practice of nocturnal docking?

*A. Wilson:* I don't believe that we have much positive evidence for it; what evidence we do have, as in the *Aethiopica*, or the Egyptian contracts I mentioned, suggests that it was a practice to be discouraged because of the attendant dangers of running aground on underground reefs on the approach to harbour, or docking by the light of torches. No doubt it did happen from time to time (and in the *Aethiopica*, although the captain advises against it, the ship does in fact approach the harbour during the night and drops anchor in the harbour just as the sun comes up), and the fact that some contracts prohibit it tells us that people were sometimes inclined to do it; but I am not aware of evidence for the specific techniques of nocturnal docking.

*A. Chaniotis:* Since nighttime sailing was mentioned, a question arises — a question that cannot be answered: I wonder how many shipwrecks happened during the night.

But I have a question on an entirely different phenomenon and its connection with artificial lighting: the existence of certain types of buildings that are dark even by day and for this reason might have required artificial illumination during both night and day. I am thinking of the *cryptoporticus* of the Smyrna basilica with its numerous graffiti, recently published by Roger Bagnall and his collaborators.<sup>4</sup> One of them explicitly mentions the dedication of a lamp by a man whose eyes had been healed.

*A. Wilson:* Indeed: *cryptoporticus* in forum complexes; rooms in warehouses or *horrea* built for security purposes without external windows; cellars and underground strongrooms; fortifications and towers in city wall circuits illuminated only by narrow arrow-slits; even the bedrooms of Roman town houses, which often had no windows at all, would all require artificial illumination by day or night.

<sup>4</sup> R.S. BAGNALL *et al.* (2016), *Graffiti from the Basilica in the Agora of Smyrna* (New York).

*A. Chaniotis:* In connection with graffiti, I should also mention that a large number of domestic graffiti and *dipinti* on wall-plaster (in Ephesus, Zeugma, Delos and elsewhere) can be associated with nocturnal activities (conviviality and sex). I treat these texts in my forthcoming study “The Epigraphy of the Night”.

*R. Schlesier:* Können wir tatsächlich aus der Dokumentation über die raffiniertere Technologie von Lichtquellen schliessen, dass die Arbeitstage länger waren?

*A. Wilson:* Certainly the possibility of longer working days now existed; but for how long anyone actually worked each day, we have very little evidence. Doubtless some people did work longer, for example slaves whose masters compelled them, or perhaps some craftsmen in order to maximise earnings from piece-work. But certainly better artificial lighting enabled round-the-clock shift-working in ways not previously possible.

