

Fri: Barrett Ch 6

Mondschn pg 34-44 54-61

Mon:Water clock usage

There are some examples of the remnants of large-scale water clocks that were used in ancient Greece and Rome. These include

- 1) the water clock in the Athenian Agora
- 2) the water clock at the Amphiarreion at Oropos ↗ Greek, 2nd century BCE
- 3) a possible water clock in the Tower of the Winds in the Roman Agora of Athens (Roman, 50 BCE)
- 4) a few smaller remnants of ancient Roman clocks in western and central Europe.

After the fall of Rome (476 CE) progress in developing water clocks passed to the Islamic world, whose golden age spanned 8th-14th centuries CE.

Demo: Wikipedia Islam Golden Age Page - map.

During the Muslim middle ages increasingly sophisticated water-clocks feature complicated moving mechanical parts to indicate time of the day and days. Some of the more notable examples are due to Ismail al-Jazari (1136-1206). Most of these are known via the writings that were left.

Demo: Al-Jazari Peacock Clock

Demo: Al-Jazari ~~Tower~~ Clock Castle Clock

Q: What broader purpose could these clocks have served?

Who might have owned these clocks.

Knowledge of this seems to have disappeared from Western Europe during the middle ages. Evidence of this includes the gift of a clock from Harun al-Rashid to Charlemagne in the 8th century CE. Evidently Charlemagne had no knowledge of such clocks.

Demo: Water Clock in Fez.

Canonical Hours Londes ⁵³⁻⁶⁶ pg ~~38-46~~ Rossum pg Ch3

The middle ages in Europe extended from 476 CE (Fall of Rome) to the 15th century CE. What was the demand for timekeeping during the middle ages?

It appears that the demands evolved during the middle ages. In the early middle ages (~500 CE → 1000 CE) the demands in western Europe initially came from organized religion. By the early middle ages religion had become a dominant factor in daily European life.

In Europe and the Near East / Middle East, there were three substantial organized religions: Christianity, Judaism and Islam. There are some general similarities:

- 1) there is an organized structure with a system of religious authority
- 2) there is a system of regular worship.

Such religions developed rules about regular worship. For example,

- 1) Judaism
 - worship after sunrise
 - worship before sunset
 - worship after dark
- } no clear times were specified
- 2) Islam
 - just before sunrise
 - just after noon
 - before sunset
 - just after sunset
 - after dark

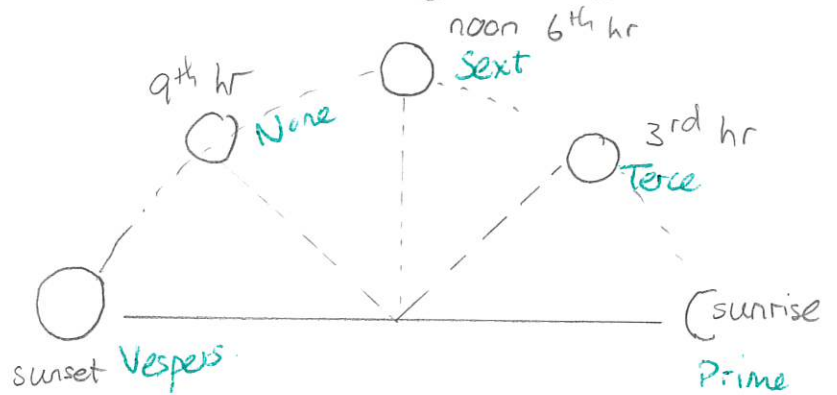
These were not very rigid and really provided "bands" in which worship could occur.

Christianity apparently adopted the original flexible schedule of Judaism but began to add additional periods of worship. Around 300 CE these began to be formalized (e.g. Tertullian)

Initially they adopted the Roman division of the day into temporal hours. Recall that this had divided the period from sunrise to sunset into twelve equal parts. Evidently there had been public signals given at these hours. The medieval Christian church simplified this by dividing the daylight hours into quarters.

It came to be that prayers were required at

- * morning
- * 3rd hour
- * 6th hour
- * 9th hour
- * sunset.



Initially this timekeeping was only loosely enforced and there was some latitude as to when exactly a given set of prayers might be said.

Relatively early in the middle ages Christianity developed monasteries. These were physical centers in which monks or nuns lived and practiced the Christian religion.

Demo: Show Wikipedia images

The rules for prayer came to be formulated via St. Benedict (530 CE) and these established

- * six daytime services/worship
- * one nighttime service/worship (matin)

Besides prayer and worship, monasteries were engaged in agriculture and small-scale home industries. These generated a succession of chores interspersed with prayer. Signals had to be provided to indicate when these tasks were to begin and end. Such signals were provided by

1) sundials during the day. These were often rudimentary dials that marked the canonical hours

Demo - search "scratch dials"

- or Wikimedia "mass dials"

2) water clocks during the night (later in medieval times) to regulate prayer during the middle of the night

It appears that in monasteries some of these water clocks were engineered to produce some type of alarm - usually the ringing of bells.