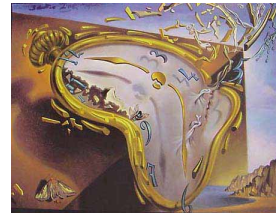
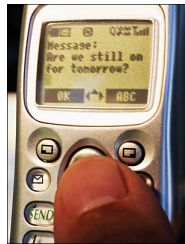
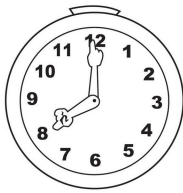


Coordination and mobile telephony

Rich Ling

What was the last text message you sent?



Exploding clock - Salvador Dalí

Social consequences of mobile telephony

- Safety
- Coordination
- Identity
- Disturbing the social sphere
- “Walled garden” effect

Coordination in society

- Time is a well entrenched method for social coordination
- Mobile telephony is developing as an alternative way to coordinate activities
 - Perhaps the most profound use of mobile telephony
 - Mobile telephony extends the range of possibilities
 - One can coordinate “on the fly”
 - One need not know the location of their interlocutor
- Plays into a sense of timeliness and punctuality (manners)

The nature of coordination

- Coordination is more complex as society becomes more differentiated and urbanized
 - Distributed housing and job patterns
 - Urban transport systems
 - Differentiation of tasks and professions
 - Complex familial arrangements
- Social coordination
 - Several actors who are planning an event (or situation) at some point in the future

The nature of coordination

- The number of people involved
 - A tete-a-tete
 - A family holiday
 - The invasion of Normandy
- The period between planning and the event
 - Immediate future "Ling, come into my office ASAP!"
 - Moderate future "Tennis this week-end"
 - The distant future "When you retire, consider moving to the Rockies."
- Degree of simultaneity and co-location
 - Simultaneous and co-located
 - Asynchronous and dispersed

The nature of coordination

- Rule based
 - "If it snows, we meet at my house."
 - "When the kids are at my house, I go to school meetings."
- External metering systems
 - "We should meet at 8:30 for lunch."
- Routine
 - "We have had our quilting club on Thursdays at 6:00 for years"
- Negotiated
 - "Where are you now?"

Time as a method for social coordination

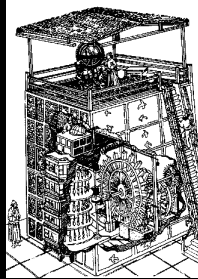
- Requirements for the use of time as a social coordination tool
 - General access
 - Robust devices
 - Reasonably priced
 - Broadly agreed upon standard
 - An etiquette or norm system



Sun dagger at Chaco canyon



Su Sung water clock



Plus or minus 100 seconds per day

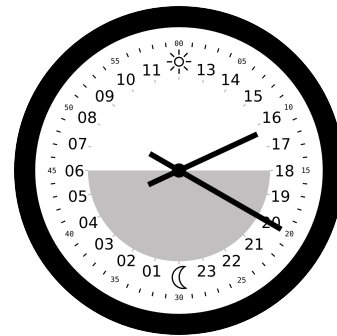


Antikythera mechanism ca. 200 B.C.

<http://www.youtube.com/watch?v=MohuAnvSPZ0>



Nicolas Droin - orodroin@free.fr - Astrolab, 2000
http://www.sed.com/balcham_worpe_demo_the_13th_century_astrolabe.html



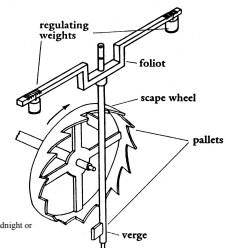
The order of St. Benedict (from ca. 529) Chapter 8: On the Divine Office During the Night

In the winter time, that is from the Calends of November until Easter, the sisters shall rise at **what is calculated to be the eighth hour of the night**, so that they may sleep somewhat longer than half the night and rise with their rest completed.

Verge and foliot escapement

The first mechanical time pieces were associated with the Benedictine cycle of prayer. (1283)

*Frere Jacques, Frere Jacques,
 Dormez-vous? Dormez-vous?
 Sonnez les matines*, sonnez les matines
 Ding ding dong, ding ding dong.*



* The time of day appointed for this service, traditionally midnight or 2 A.M. but often sunrise

<http://www.youtube.com/watch?v=HdI.TUx4xq8>

<http://www.youtube.com/watch?v=7Dd4Y5EMy&feature=channel>

The spread of clocks in the 1300's

Time measurement was framed around personal associations
"The time it takes to walk a quarter mile"

Mechanical periodicity took the place of organic and functional periodicity

Took the form of older sun/astrological instruments

Included religious motifs

Time used to regulate:

- Market time
- Town meetings
- Daily pauses
- Sporting events
- Torture
- Religious cycles

<http://www.youtube.com/watch?v=VF3ANS3GAg8&feature=channel>



Orloj in Prauge



http://www.praguearts.com/orloj/orloj_older.html

Astrarium of de' Dondi



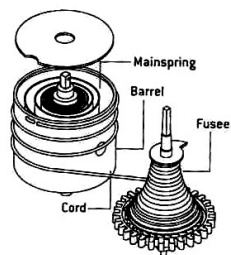
Near Ponte di Rialto



Fusee escapement

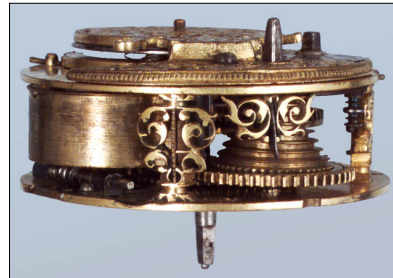
The Fusee escapement allowed for the development of portable time keeping devices.

Used in clocks until WW II.

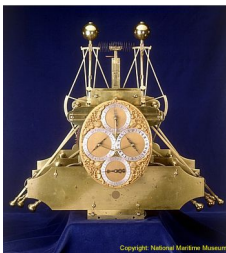




Fusee escapement



Harrison's maritime clocks



H-1 1730-35



H-4 1755-59

Waltham watch

The first mass produced portable watch.
Used in the American Civil War to coordinate military movements.

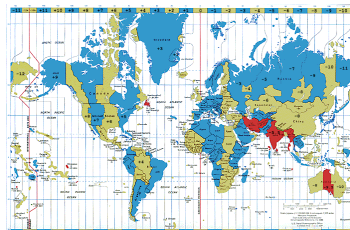


International time zones

Agreed upon in 1884

The development of railroads, particularly in the US, made it necessary

Before 1884 zones - 144 "time zones"



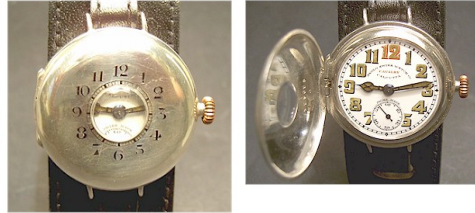
Early "mens" wrist watch



Boer war and WW I wrist watches



WWII watch



WWI watch



Watches from WWI



First quartz clock
Warren Morrison 1927



Pulsar watch: The first digital quartz watch



Broad range of wrist devices



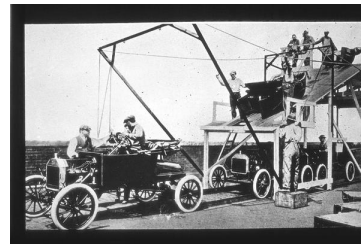
Most complex watch: Patek Philippe Calibre 89



- | | |
|----------------------------------|-------------------|
| Day of the month | Month |
| 12-hour recorder | Thermometer |
| Day of the week | Date of Easter |
| Hour of second time zone | Time of sunrise |
| Moon phase display | Equation of time |
| Winding crown position indicator | Star chart |
| Century decade and year displays | Sun hand |
| Leap Year Indicator | Time of sunset |
| Power reserve | Split second hand |

First atomic wristwatch

HP 5071A Cesium Beam Primary Frequency Reference



Simmel's thought experiment

“ . . . if all the watches in Berlin suddenly went wrong in different ways even only as much as an hour, its entire economic and commercial life would be derailed for some time”

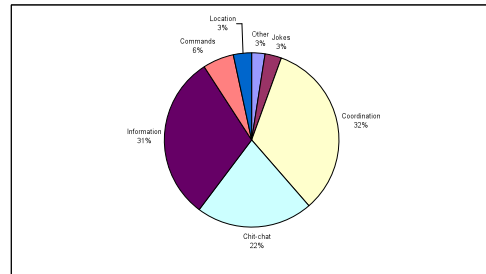
Time as a method for social coordination

- Only in the late really achieved in the late 1880's
 - General access
 - Robust devices
 - Reasonably priced
 - Broadly agreed upon standard
- Etiquette and time
 - We carry with us a morality in relation to punctuality and tardiness.
 - Informally codified norms associated with time
 - Different by country
 - Different by status
 - "At 10 minutes I owe you an explanation: 'the freeway exit was closed. I had to go four miles out of my way.' After 20 minutes I have to make a full and serious apology. After 40 minutes I had better not show up at all."

Mobile telephony as a coordination system

- Individual addressability
- Mobile telephone allows for direct negotiation with regards to coordination
 - No reference to external metering systems such as time
- Eliminates the need to know geographic coordinates
- Generally more applicable to small groups
- Three general uses of mobile telephony for coordination
 - Mid-course adjustment
 - Iterative coordination
 - Softening of time

Content of SMS messages



Mid-course adjustment

Anne: That is pretty nice if you are away from home and cannot reach somebody via the regular telephone then you can call and leave a [SMS] message. So we use a lot of messages.

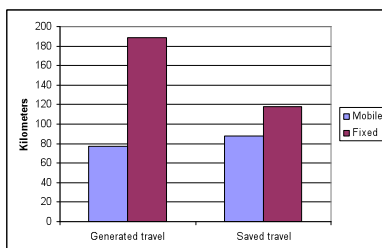
Interviewer: What kind of messages do you send?

Anne: It is if somebody is late, it can be if we need to buy something, if there is something important that he needs to bring home, if he needs to call somebody or if he has been home and has to give me a message. It is not like 'Hi, I am doing fine, etc.' It is something that we need.

Mid-course adjustment

Ole Johan: It is very nice to be available when you know that you have kids in the marching band and the soccer team you know. And there are always messages regarding picking-up and driving and not the least with the marching band. There can be driving for picking up things for the [annual benefit] flea market and things like that. And it is nice to be available, that you can get messages and such. It is things like that.

Mid-course adjustment

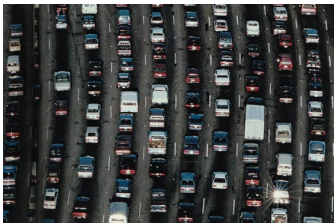


Iterative coordination

- Progressive specification of meetings
- Swarming (Rheingold)
- Updated status as to the meeting

Ola: . . . in the summer I work as a soccer coach for some 14 year olds. And when you have 50 of them with all that that includes of this and that. Like yesterday, it started to rain a little and so you get 15 – 20 [calls] in the space of a very short time asking if there is going to be practice and a lot of things like that. So I could do without it but I have to have it you know.

I will be there soon (*Jeg kommer snart*)
 Come approx. Five min late (*Kommer ca. fem min for sent*)
 IM ON THE BUS NOW. (Original in English)
 Am on the way home (*Er på vei hjem*)
 In a traffic jam. lots of traffic. coming soon (*Står i kø. mye trafikk. kommer snart*)
 Yeah I'm coming. (*Ja jeg kommer.*)

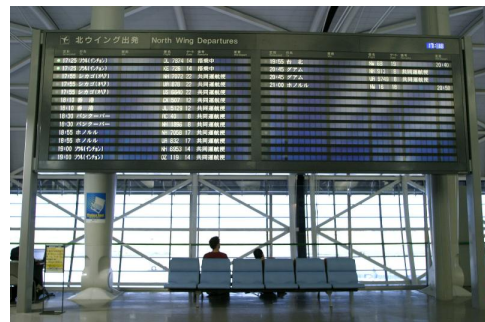


Softening of time

- Common form of SMS
- Allows slack in one's social interaction
- Can relax scheduling
- Is a type of courtesy
- Widely seen as a positive effect of mobile telephony
 - 92% agreed that the mobile telephone can be used to notify others that one is late

Advantages of mobile coordination

- More dynamic than time based coordination
- No reliance on an external metering system
- Reduces the need for contingency planning
- Allows the negotiation of meetings
- Can be used for the coordination of breaking events "swarming"



Limitations of mobile coordination

- Difficult to coordinate large numbers of individuals with the mobile telephone
- Large institutions can not rely on negotiated meetings
- Interactions between institutions must be coordinated
 - Work – day care – voluntary activities
 - Mobile can round off the edges, but not change the need for time as a coordination mechanism
- Interaction between “soft” and “hard” schedules can cause problems
 - People late for hair appointments etc
- The mobile telephone is not as robust, inexpensive or ubiquitous as time keeping devices

There is basketball practice outside 19:30 (*Det skal være basketballtrening ute 19.30*)

Is it ok, Then we have an agreement. 16:02 o'clock at my place, see ya, Me (*De er greit. Da har vi en avtale. Klokka 16:02 hos meg. Hils. Meg!*)

hi :) I can meet today and 17:00 o'clock see ya, Hug M____ (*hei :) ja jg kan møte dg kl 1700 snakkez! Koz M_____*)

Howdy=> Gallery tonight? 19 o'clock? I'll be there! Hug to you! I love you, Hugz=> (*Heisann=> Galleri i kveld? Kl. 19? I'll be there! Kos deg til da! Gla i du! Klemz=>*)

Synthesis of time and mobile coordination

- There is likely to be a synthesis of time and mobile telephony
- New forms of power
 - Who waits for whom
 - How much access do you have
 - Who gets “parked” (I'll let you know when we decide what we are doing on Saturday)
 - The problem of learning mobile time management (deaf persons)