





The Heavens & Timekeeping Symbolism & Expediency

Fr. Paul Gabor, S.J., PhD. Vatican Observatory





* Timekeeping is a practical issue:





* Timekeeping is a practical issue:

"The observation of the seasons and of months and years is as essential to the general as it is to the farmer or sailor."

Plato, Republic, 527c (360 BC)





* Timekeeping is a practical issue:

"The observation of the seasons and of months and years is as essential to the general as it is to the farmer or sailor."

Plato, *Republic*, 527c (360 BC)

* But its (less practical) roots run very deep...





* New Year's Eve: a social ritual linked to timekeeping

Paul Gabor, Vatican Observatory





* New Year's Eve: a social ritual linked to timekeeping* Pretext for merrymaking? Celebrating a convention?





* New Year's Eve: a social ritual linked to timekeeping
* Pretext for merrymaking? Celebrating a convention?
* Mircea Eliade (1907-1986): *Regeneration of time*



Paul Gabor, Vatican Observatory





* New Year's Eve: a social ritual linked to timekeeping
* Pretext for merrymaking? Celebrating a convention?
* Mircea Eliade (1907-1986): *Regeneration of time** Fertile Crescent & Australian Aboriginals
=> ancient (lower limit 60,000 yrs)



Paul Gabor, Vatican Observatory





New Year's Eve: a social ritual linked to timekeeping
Pretext for merrymaking? Celebrating a convention?
Mircea Eliade (1907-1986): *Regeneration of time*Fertile Crescent & Australian Aboriginals

ancient (lower limit 60,000 yrs)

* Ritual cosmogony preceded (provoked) by ritual chaos







Timekeeping schemes (calendars, time zones, UTC...) are <u>artifacts</u>



Paul Gabor, Vatican Observatory

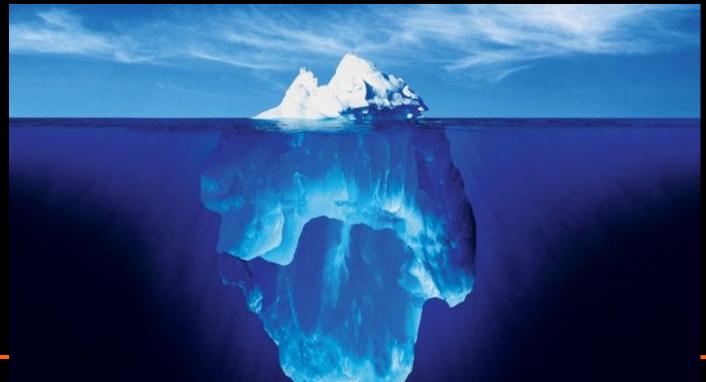




Timekeeping schemes (calendars, time zones, UTC...) are <u>artifacts</u>

BUT

with powerful symbolism







Timekeeping schemes (calendars, time zones, UTC...) are <u>artifacts</u> = crafted by people

BUT

with powerful symbolism: life of their own







Astronomical conformity of timekeeping schemes * is (was) <u>practical</u>.





Astronomical conformity of timekeeping schemes * is (was) <u>practical</u>. * it has been a <u>principle</u> accepted universally:

Paul Gabor, Vatican Observatory





Astronomical conformity of timekeeping schemes * is (was) <u>practical</u>. * it has been a <u>principle</u> accepted universally: "Accuracy in observing feasts pleases the Gods." Geminos, *Isagoge*, VIII, 6-9 (1st c. BC)





Astronomical conformity of timekeeping schemes * is (was) <u>practical</u>. * it has been a <u>principle</u> accepted universally: "Accuracy in observing feasts pleases the Gods." Geminos, *Isagoge*, VIII, 6-9 (1st c. BC)

"The verification of the principles of ancient astronomical canons has to be sought in the Heavens."

Hanshu, j. 21A

"It is good to conform to the Heavens in order to bring about the accords [between observation and calculation]." *Jinshu*, j. 18







* A universally accepted principle...





* A universally accepted principle...* Not always followed in reality.









* Or (more often) because it was in conflict with other principles:





* Or (more often) because it was in conflict with other principles:

* Inertia

Julian calendar >10 days out of sync before it was reformed.





* Or (more often) because it was in conflict with other principles:

* Inertia

Julian calendar >10 days out of sync before it was reformed.

* Timelessness

The Kings of Egypt had to swear before they took office that they would not change the calendar.





* Or (more often) because it was in conflict with other principles:

* Inertia

Julian calendar >10 days out of sync before it was reformed.

* Timelessness

The Kings of Egypt had to swear before they took office that they would not change the calendar.

* Expediency: empirical \rightarrow calculated









Symbols: perceived as reality





Symbols: perceived as reality Noon: local solar time vs time zones, DST





Symbols: perceived as reality

Noon: local solar time vs time zones, DST 7-day week





Symbols: perceived as reality

Noon: local solar time vs time zones, DST 7-day week

A symbol works as long as it is <u>perceived</u> as grounded in reality.





Symbols: perceived as reality

Noon: local solar time vs time zones, DST 7-day week

A symbol works as long as it is <u>perceived</u> as grounded in reality.

Day: UTC vs TAI









* Maybe an updated "Bulletin A" procedure.





* Maybe an updated "Bulletin A" procedure.* Symbolism maintains its link with astronomy.





* Maybe an updated "Bulletin A" procedure.
* Symbolism maintains its link with astronomy.
* Timekeeping empirical (not calculated).





Replace 1972 definition of UTC by calculated rule.





Replace 1972 definition of UTC by calculated rule.

* Conforms to astronomy





Replace 1972 definition of UTC by calculated rule.

* Conforms to astronomy* Maximum expediency





Replace 1972 definition of UTC by calculated rule.

* Conforms to astronomy
* Maximum expediency
* Unrealistic







* Maybe UT1 also directly available.



* Maybe UT1 also directly available.* Maximum expediency.



* Maybe UT1 also directly available.
* Maximum expediency.
* Civil time decoupled from Earth rotation => symbolism destabilised; instability small but growing





TAI <u>temporarily</u> becomes the sole basis of civil timekeeping; a will to once <u>re-couple</u> civil time to Earth rotation is demonstrated. Re-coupling – e.g. a rule for leap seconds.

Cannot be done as yet: a longer series of measurements needed.





TAI <u>temporarily</u> becomes the sole basis of civil timekeeping; a will to once <u>re-couple</u> civil time to Earth rotation is demonstrated. Re-coupling – e.g. a rule for leap seconds.

Cannot be done as yet: a longer series of measurements needed.

* Maybe UT1 also directly available.





TAI temporarily becomes the sole basis of civil timekeeping; a will to once <u>re-couple</u> civil time to Earth rotation is demonstrated. Re-coupling – e.g. a rule for leap seconds.

Cannot be done as yet: a longer series of measurements needed.

* Maybe UT1 also directly available.* Maximum expediency.





TAI <u>temporarily</u> becomes the sole basis of civil timekeeping; a will to once <u>re-couple</u> civil time to Earth rotation is demonstrated. Re-coupling – e.g. a rule for leap seconds.

Cannot be done as yet: a longer series of measurements needed.

Maybe UT1 also directly available.
Maximum expediency.
General perception maintained: no danger to symbolism.











- * Space missions: probably linked to Earth.
- * Colonies: eventually their own time.





Colonies: eventually their own time.
 Respecting local astronomical conformity





Colonies: eventually their own time.
 * Respecting local astronomical conformity.
 vs
 * Time conversions Earth/colonies





Colonies: eventually their own time.
 * Respecting local astronomical conformity.
 vs
 * Time conversions Earth/colonies
 * Ergonomics (remember "Centaurian Time")





* Colonies: eventually their own time.
 * Respecting local astronomical conformity.
 vs
 * Time conversions Earth/colonies
 * Ergonomics (remember "Centaurian Time")

* Mars: solar day = 24h 40min





Colonies: eventually their own time.
 * Respecting local astronomical conformity.
 vs
 * Time conversions Earth/colonies
 * Ergonomics (remember "Centaurian Time")

* Mars: solar day = 24h 40min
* Moon: orbital period = 27 * (24h 17min)





Colonies: eventually their own time.
 * Respecting local astronomical conformity.
 vs
 * Time conversions Earth/colonies
 * Ergonomics (remember "Centaurian Time")

* Mars: solar day = 24h 40min
* Moon: orbital period = 27 * (24h 17min)
* Ganymede: orbit. p. = 7 * (24h 32min)



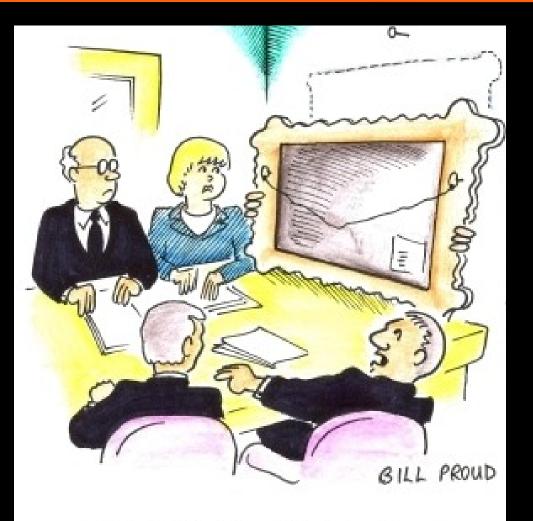












"He's still looking at the big picture."

Paul Gabor, Vatican Observatory

Summary



- * Get in touch with underlying forces* Understand the dynamics
 - * Conformity
 - * Continuity
 - * Timelessness
 - * Inertia
 - * Expediency: empirical \rightarrow calculated
 - Relationship between symbols and reality; general perception and fact
- * I prefer to maintain the coupling.
- * If decoupled, then
 - * Make clear that decoupling is temporary
 - * until a new coupled scheme (TIMEFRAME!)
 - * improved because more expedient (calculated).



"He's still looking at the big picture."