



A History of Time

Continuing our series of looking at timepieces that have, or will, shape the way we live our lives today, QP editor, *James Gurney*, makes his choice. The Long Now Foundation was established in 1996 to develop, among other projects, a Clock that would become the seed of a long-term cultural institution in the framework of the next 10,000 years.



James Gurney
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The Long Now Foundation's 10,000 Year Clock

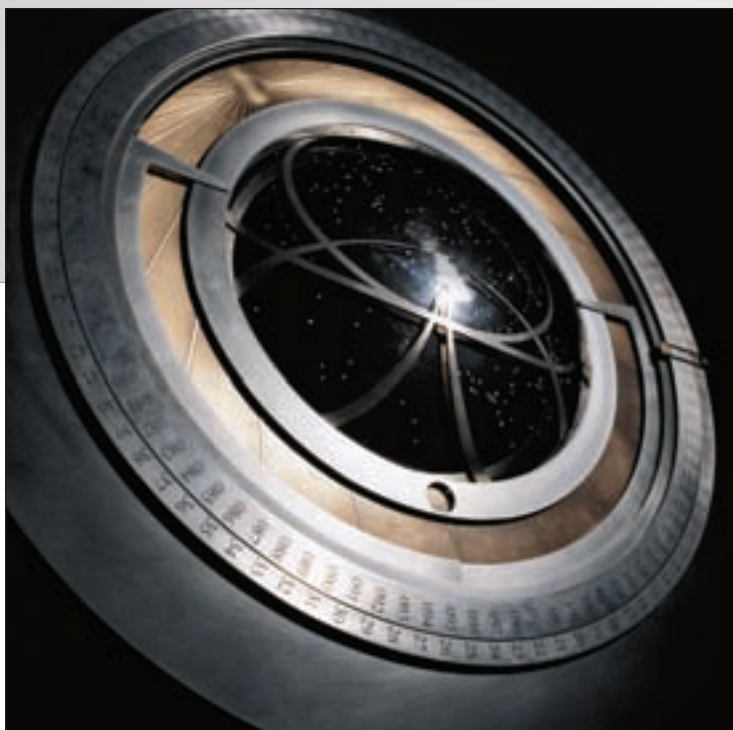
Most of the timekeepers in this series will hail from the 18th and early 19th centuries, which is natural enough given that it was advances made during this time that transformed timekeeping from a public activity into a private one; from a technology that could measure in minutes to one that was capable of capturing fractions of a second. The experience of timekeeping changed from an external signal as distant as a church bell, to something as immediate as the ticking of a pocket watch. As horological technology developed and access has broadened, the perception of time available to ordinary people has narrowed in focus from parts of a day to parts of a second. This series focuses mainly on the clocks and watches that drove this technology on.

The Long Now Foundation turns that trajectory on its head, being centred around a clock conceived to function for 10,000 years, without indications for hours or minutes and located in a national park in Nevada - a location so remote that few people will see it even once in their lifetime. This might seem almost atavistically primitive and more so given that the idea's originators have been pioneers in computer science and the development of the internet. You might also take it to be an indulgent antidote to life in the digital age, dreamt up by frazzled Silicon Valley pioneers looking for a little perspective. That, however, would be a mistake, particularly given the sheer creativity of the team behind it and forward-thinking luminaries supporting the project.

Brainchild of computer science pioneer, Danny Hillis, The Long Now Foundation is a conscious attempt to refocus ideas of time away from the imperceptibly small - not in any nostalgic sense, but in terms of promoting 'slower/better' as a counterpoint to the dominance of 'faster/cheaper'. Hillis points out that thinking about the future seems to have shrunk from centuries and decades to months and weeks. As well as the Clock of The Long Now, the foundation set up by Hillis also stages seminars on future thinking - the Rosetta project that seeks to preserve languages, both human and digital, and the Long Bet which looks at long-term predictions, a particular example being the date by which people will fly commercially on pilotless aircraft.

The Clock is the main project, however, and is a genuinely intriguing exploit, both from its philosophical perspective and from the principles guiding its design set out by Danny Hillis and Alexander Rose. To quote from longnow.org, the principles are:

- **Longevity:** With occasional maintenance, the clock should reasonably be expected to display the correct time for the next 10,000 years.
- **Maintainability:** The clock should be maintainable with bronze-age technology.
- **Transparency:** It should be possible to determine operational principles of the clock by close inspection.
- **Evolvability:** It should be possible to improve the clock with time.



Images of the Clock's dial and prototype by Rolfe Horn courtesy of The Long Now Foundation.

- **Scalability:** It should be possible to build working models of the clock from tabletop to monumental size using the same design.

These principles have fostered a completely fresh look at mechanical timekeeping, though unsurprisingly some of the main concerns have been exactly those of watchmakers working in more conventional modes. The biggest single factor though is the timescale the clock is expected to work on. As Alexander Rose explains in his introduction to the book of plans for the Clock: "Timing in the Clock comes from two sources; one accurate in the short term and one in the long term. The short-term timing is kept by a torsional three bar pendulum which twists back and forth once per minute and is impelled by the drive. The long-term timing is achieved through a solar synchroniser. The synchroniser when struck by sunlight at noon on any sunny day heats up a piece of metal causing it to expand and give a mechanical impulse to the Clock's timing system to correct any error that may have accumulated since the last sunny day."

However, something as long in term as the 26,000 year Precession of Equinoxes cycle, which the Clock's night sky displays are calibrated to, leads

to unexpected difficulties. As your 'standard' Equation of Time watch will tell you, solar midday varies noticeably from that predicted by calendar time and any clock or watch with astronomical indications has to account for this sort of error. The precession is a similar variation, writ over a longer period. However, with such a long period, errors of a different order emerge. One recent problem is created by the predicted effects of global warming. As temperatures rise, so water mass is potentially redistributed from the poles to the equator thus speeding up the earth's rotation and putting the calendar displays out of sync.

The Clock is still at the planning stage, though a site has been found and purchased in Nevada's Basin National Park and the first prototype is on display at the Science Museum's *Making the Modern World* gallery. Is it truly an icon in the way H3 or Mudge's Lever escapement are? Not in the sense that it will have a direct effect on future watchmaking, but in terms of scope, ambition and thought, quite apart from the timescale envisaged, the Clock of The Long Now Foundation deserves a place in our series. What other timepiece has been conceived with intention of changing the perception of time? ☹