THE LONG NOW FOUNDATION

Press Coverage

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Telling Time Piece

By Lisa M. Krieger

Creators of the Millenial Clock, designed to represent humanity in the next 10,000 years, also hope to inspire us in the present.

The clock of the future keeps getting stuck in the present.

It is a timepiece meant to speak to us now, even if it was designed to outlast us all and is now being reworked to ensure its longevity. It is the Millennial Clock, a mechanical marvel being refined by Bay Area futurists and engineers to keep perfect time for the next 10,000 years.

In the whirrings of its bronze workings lies the fusion of precise computing and boundless unknown. The clock is deliberately designed to survive human neglect -- or even survive humans. Its briefest unit of measure is one minute. Its fastest dial moves only once a day. It ticks every year and chimes every thousand.

The idea of the clock, its makers say, is about more than marking increments on a calendar. Its ultimate aim is to expand our notions of time and purpose.

There's just one hitch. Designed to withstand thousands of years of wear and tear, the clock is often stilled by human neglect -- forgotten by the people in charge of winding it.

``The real issue is not engineering but human,'' said designer Alexander Rose of the Long Now Foundation, the San Francisco-based organization that supports the clock project.

The timepiece is housed at the London Science Museum, where staff members get busy and overlook the routine rotation of two towers needed to keep it going.

``What's hard is remembering to wind the clock,'' Rose said. ``And if you don't wind it, you need to completely restart it.''

That doesn't particularly bother Rose. He's not blaming anyone; after all, the museum staff isn't used to projects like this clock. And the current clock is just a prototype -- the final product, now being reworked in San Rafael and someday to be installed in a mountain in Nevada, will be far simpler to run.

Metaphor for future

It could have been completely automated. But that's not the point. The clock is a metaphor for the future -- something we're all responsible for, said the Long Now Foundation. So the necessity for regular human intervention was built into the clock.

Being realists, Rose and his team are counting on the fact that somebody somewhere will forget to rewind the clock

sometime during its long lifespan. Or, in a more gloomy scenario, we may not last long enough to take care of it.

``If our culture is lost and another one finds it, it's important to have a winding mechanism that could be operated by hands different from ours,'' Rose said. ``Another culture could look at the mechanical mechanism, take it apart and put it back together and understand how it works.''

So, like everything else about the clock, that scenario has been built into its design. Unlike an electronically driven clock, the mechanics of this clock illustrate its function.

The challenge was to make it not only interesting to our generation but also explicable to the next, said the Long Now Foundation, whose members include Internet guru Esther Dyson, musician Brian Eno, futurist Paul Saffo and Stewart Brand, author and creator of the Whole Earth Catalog. It was Eno who coined the name ``Long Now,'' a phrase that links the future with the past and present.

Conceived by supercomputing pioneer Danny Hillis, the clock tracks the moon's position and phase, local rising and setting times of sun and moon, equinoxes, solstices and the Gregorian calendar up to 10,000 years from now.

It is constructed of ultra-modern materials, such as a nickel-copper alloy that does not expand or contract with temperature variations. Its pendulum, which swings on a horizontal axis, is made of three 22-pound tungsten balls. The power for the pendulum comes from two helical, or spiral, weight drives on either end of the clock.

But it has the grace of something out of the Bronze Age. Its most lovely feature resembles a woman's torso -- yet is actually a mathematical calculation turned three-dimensional, designed to measure the 26,000-year precession of the equinoxes, thus allowing the clock to compensate for the elliptical eccentricities in Earth's orbit.

Reminder for the present

One could ask why anyone who discovers the clock in 10,000 years would care what time it is.

The clock isn't built for them -- it's built for us, Hillis said. His goal is to refocus human attention from the short term to the long term. Whether the clock actually endures 10,000 years is beside the point. Hillis just wants us to look ahead as far as we can look back.

``It is to encourage us to create things that require 10,000 years to measure,'' he wrote in his now-famous ``Clock Manifesto'' in a 1995 issue of Wired magazine. He selected 10,000 years as a goal, he said, because it is the same length of time human culture has been ascendant.

According to Hillis, ``When I was a kid, three decades ago, the future was a long way off . . . It's as if the future has been shrinking one year, per year, for my entire life -- 2005 is still too far away to plan for and 2030 is too far away to even think about. So why bother making plans when everything will change?

``Still, there is more to this shortening of the future than dates. It feels like something big is about to happen: Graphs show us the yearly growth of populations, atmospheric concentrations of carbon dioxide, Net addresses and m-bytes per dollar,'' he said.

It's been said that this project has all the hallmarks of a Danny Hillis project; it's original, just barely feasible and changes how others think of the world.

The creator of the world's fastest computers has designed the world's slowest clock. According to Hillis, ``When I tell my friends about the millennium clock, either they get it or they don't. Most of them assume I'm not serious, or if I am, I must be having a midlife crisis.''

It is, ironically, an antidote to the computer revolution that Hillis helped forge -- a revolution that was supposed to give us more time but instead makes us more rushed than ever. Hillis was a pioneer in the high-performance computing market, creating what is called a ``massively parallel'' computer, which achieves vast speeds by breaking up large problems into tiny chunks of data that can be solved simultaneously.

The clock's inspiration

Hillis, whose multidisciplinary genius is the stuff of legend, has compared his latest project to Stonehenge and the Pyramids.

The inspiration came, he said, from a tale about the oak beams that span the ceiling of College Hall at New College, Oxford. When the beams needed replacing, carpenters used oak from trees planted in 1386 when the dining hall was first built. Hillis was startled by the notion that a 14th-century builder had planted the trees in anticipation of the time, hundreds of years in the future, when the beams would need replacing.

``I plant my acorns knowing that I will never live to harvest the oaks,'' he wrote, ``I have hope for the future.''

A couple of key rules evolved out of the mandate to look ahead when designing the clock. One was to avoid anything that involved sliding friction, such as gears. The others: Keep it clean and dry. Plan for earthquakes. Don't tempt thieves. Use familiar materials. Make lots of spare parts. Include a manual.

And, if neglected for millenniums, make it easy to rewind.

The team is designing a second prototype in a warehouse in San Rafael, which will be almost twice the size of the first one -- 18 feet tall. Some of the design details are changing as it is improved and increased in mass. The final product will be about 40 feet fall, with pendulum bobs that weigh 200 pounds each. Rings holding its pins will be about 20 feet across.

Even if the clock fails to continue ticking into the distant future -- if it succumbs to decay, corrosion, earthquake or human neglect -- the project will not have failed, Rose said.

``The clock gets people's attention. It is the theater, the draw. It gets the conversation started.

``It gets people asking: How does it work? What will happen? And why does it matter?''

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