

Looking For The Long Now

If Daniel Hillis is right, crowds will begin assembling well before December 31, 02099, in anticipation of a singular event: the chiming of his 10,000-Year Clock.

Hillis, an adjunct professor in the Media Laboratory at the Massachusetts Institute of Technology, says the proposed clock, a Stonehenge-size oracle of time to be engineered with the durability of the pyramids and perhaps located in the American Southwest, will remind humankind that we are not just living in the now; we are living in what musician Brian Eno has called the "long now."

As a scientist who has been known to drive a fire truck to work and once designed toys for Milton Bradley, Hillis has a history of thinking off the scale. He pioneered the concept of massively parallel supercomputers (one with 64,000 processors) and is one of four celebrated Imagineering Fellows hired by Michael Eisner to rejuvenate entertainment technology for the Walt Disney Company. But with the idea of the 10,000-Year Clock, Hillis has "imagineered" something as sweeping as time itself.

The proposal already has attracted a band of visionaries, including Eno; Douglas Carlston, founder of Broderbund Software; Paul Saffo, director of the Institute for the Future; Esther Dyson, publisher and editor of Release 1.0 newsletter; Peter Schwartz, chairman of Global Business Network; Kevin Kelly, executive editor of *Wired*; Mitchell Kapor, founder of Lotus Software; and Stewart Brand, founder of *The Whole Earth Catalog*.

Together they have established the San Francisco-based Long Now Foundation, which is determined to build the clock and have it operating by December 31, 01999, so that the world can hear an inaugural "cuckoo" that won't reoccur until 02999. "The clock ticks once a year," Hillis explains, "chimes on the century, and the 'cuckoo' comes on the millennium."

The description of its sound is just a figure of speech, but to the members of the Foundation, the 10,000-Year Clock synthesizes the long-now idea.

"For most of us, 'now' is about a week, sometimes a year," says Brand. "For some traditional tribes in the American northeast and Australia, 'now' is seven generations backward



and forward [about 420 years]. Just as the Apollo photographs of earth gave us a sense of 'the big here,' we need something which gives people a sense of 'the long now.'"

Some might ask: Why bother? But Hillis responds with a story that illustrates his intention: When the old oak beams in the ceiling of College Hall at New College, Oxford, England, needed replacing during the last century, he says, carpenters cut the new beams from oak trees planted for just that purpose five hundred years earlier by the original fourteenth-century builders. Hillis wonders who's planting our oaks. He worries that the acceleration of technology has blurred our vision, that society has developed a short attention span.

"Our problem is that, literally, we cannot imagine the future," he says. "When I was a kid, thirty years ago, the future was a long way off. Dates like 1984 and 2001 were comfortably remote. Yet, in all this time, the future that people think about has not moved past the millennium. It's as if the future has been shrinking one year per year for my entire life."

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What we are left with, according to Hillis, is an overemphasis on the present, which has distorted our responsibility to the future. Our technology reflects this. He cites the Year 2000 race to change all the computer chips and programs to accommodate a year that doesn't begin with "19" because programmers thirty years ago didn't consider the need.

Even our hardware is unreliable, he says. Within five years, nearly all federal transactions (health, taxes, etc.) will take place electronically. All literature will soon be digitized, yet archivists and librarians warn that electronic scrolls — computer disks, CD-ROMS, magnetic tapes — appear to be far less durable than simple parchment. For instance, scientists at the Jet Propulsion Laboratory in Pasadena, California, recently tried to read some of the data collected from the 1976 Viking-Mars mission. The data, thought to be safely stored on magnetic tapes, already had begun to decompose.

Hillis believes society needs a long-focus lens to correct its myopia. The 10,000-Year Clock is his prescription.

"Some sort of balance to the short-sightedness is needed," he says. "Some mechanism or myth that encourages the long view and the taking of long-term responsibility, where long-term is measured at least in centuries."

Hillis hopes the 10,000-Year Clock

and a planned adjoining library eventually will embody “deep time” in the public mind, becoming an attraction so compelling and charismatic it will draw travelers from around the world — a utile Tomorrowland.

The clock might even operate on tourist power generated by an apparatus that harnesses the energy in foot traffic. Other suggestions for power have included seasonal temperature variations, water, wind, or tides. Hillis favors human winding because it more appropriately suits the intention to make the clock a cultural icon.

At present, the Long Now Foundation is scouting sites for a permanent location. Once constructed, the clock will be housed beneath an arena-size translucent dome, probably somewhere in the high desert — suitable as much for its preservative climate as for its galvanic horizons.

Hillis has designed and patented a digital-binary mechanism that will run the clock, and he knows its face will resemble a 100-foot disc composed of as many as fourteen washer-shaped rotating rings.

In the current design, eleven inner rings will plot astronomic phenomena — revolving in synchronization with the position of the sun, moon, and the six visible inner planets. The three inner rings will represent, respectively, an astrolabe (an ancient tool for showing the position of the brightest stars at any time or date); an indicator to track the precession of the equinoxes on its 25,872-year westward rotation through the ecliptic; and an eclipse predictor.

A massive gimbal-mounted armillary sphere (a celestial instrument first used by Greek astronomers that represents the sky in a skeletal framework of intersecting circles) will arc across the clock’s face, spanning the eleven inner rings and buttressing a lens

aligned with the midday sun.

The three rings outside the armillary will function like the hands on a watch, providing a 10,000-year Julian calendar. Notched like protractors, they will click perpetually through the index window from 01999 through 11999, taking, respectively, one year, 100 years, and 1,000 years to complete their revolutions. Each day is thus aligned with the corresponding astronomic events indicated on the inner rings.

Hillis hasn’t decided which material will be used to construct a clock capable of surviving 100 centuries. Long Now Foundation Executive Director Alexander Rose recently solicited suggestions from the Internet (www.longnow.org). Responses ranged from sober to silly:

“Use granite. It lasts longer.”

“Assuming the clock will be housed in either a vacuum or an environment flushed with nitrogen, stainless steel would last 10,000 years.”

“Sheets of sapphire can stand up to anything.”

“So can the skins of politicians.”

“Ceramics, glass, and rocks are the only reliable artifacts we find now in tombs that are thousands of years old.”

“Stay away from all metals except gold, but don’t put any solid gold in — eliminate any temptation for looters.”

“We already have a 10,000-year clock. It’s called ‘the stars.’”

Whatever material the builders decide to use, to stem the ravages of time, only about one-third of the dome housing the clock will protrude above ground.

The Foundation’s first step will be to build an eight-foot-tall prototype that Rose estimates will cost “between \$500,000 and \$1 million,” of which half has been donated. Next, it will construct an “urban clock” in a city still to be chosen to promote interest in the project and generate funds. The urban

model, according to Rose, probably will be twenty feet tall and cost about five times as much as the prototype.

“We’re looking at cities on the West Coast because we have so many good contacts there,” he says. “The [permanent] desert version will probably cost in the tens of millions of dollars, but it’s not possible to estimate that until we find a site. The funds so far have all come from donations, although we are starting to look at foundation grants.”

As Hillis envisions it, the permanent structure will have two ten-foot wide ramps, wrapped around each other into a sort of “three-dimensional infinite spiral.” Visitors will ascend the ramps to a spot from which they can peer down on the positions of the giant rotating rings and imposing arms. From there, they can descend into the clockworks and the gallery of deep time to inspect the disc alignments, examine the archives and displays, and ponder a heritage that conceived and maintains a human almanac extending 3,650,000 days.

Hillis believes the library will become a repository “of the deep future,” housing extreme long-range scientific studies and acquiring what he calls a “responsibility record,” a register of policy decisions accumulated from the legacy of more than 300 generations. And the clock, in addition to telling time, also will tell us something about ourselves.

“Such icons reframe the way people think,” says Hillis. “The point is to explore whatever may be helpful for thinking, understanding, and acting responsibly over longer periods of time. For now, we are building an astonishing clock and a unique library. We’ll see what develops from there.”



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