

The 10,000-Year

By Cynthia G. Wagner
Photographs by Rolfe Horn

Nearly a millennium ago, the designers of gothic cathedrals planned structures that would take perhaps centuries to complete. Yet, they built, knowing they might never live long enough to see their visions realized. The faith of the cathedral builders was future directed—and their work was astonishingly innovative.

A similarly future-directed and grandly ambitious project has emerged in the "Clock of the Long Now," the brainchild of computer designer Daniel Hillis. Observing that our decision-making horizon has shrunk at the same time our potential impacts on future generations have grown, Hillis proposed the building of a 10,000-year clock as a long-term project to help overcome our mental myopia: "a large (think Stonehenge) mechanical clock, powered by seasonal temperature changes. It ticks once a year, bongs once a century, and the cuckoo comes out every millennium."

Why 10,000 years? This time frame was suggested because it was 10,000 years ago that the last ice age ended and what might be called civilization began. It is appropriate to strive to look as far forward as we are able to look backward.

The hope is that the image of such a clock could potentially inspire people to think differently about the future, just as images of Earth photographed from space taught people to think differently about the fragility of our planet's environment.

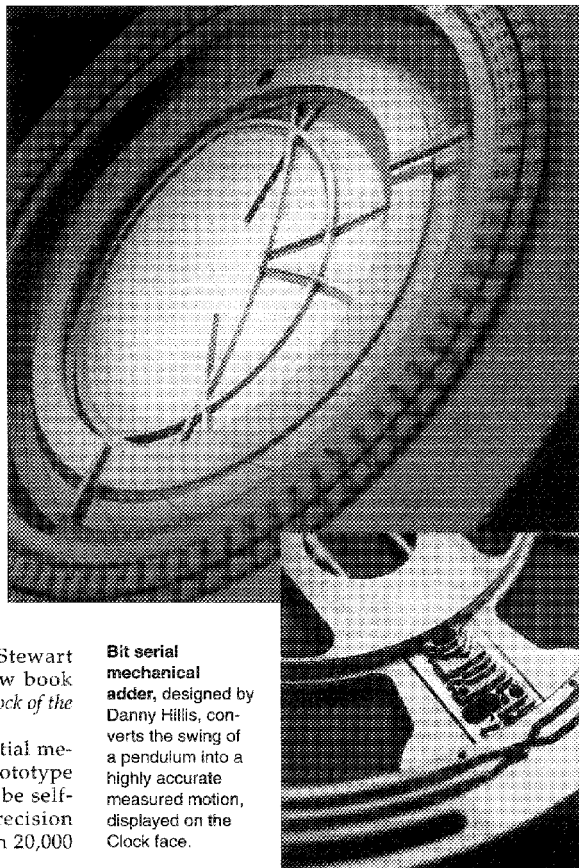
And so the Clock project was born, evolving into a Clock/Library Project, "with the realization of the need

Our inability to think in the long term leaves us incapable of taking responsibility for the future.

To wake us up to a longer sense of time, a group of thinkers is devising plans for a 10,000-year clock.

Face of the Future?

Prototype face of Clock of the Long Now. The inner rings mark natural cycles: sun, moon, sunset, and sunrise indicators. The outer rings mark calendar cycles: centuries and years.



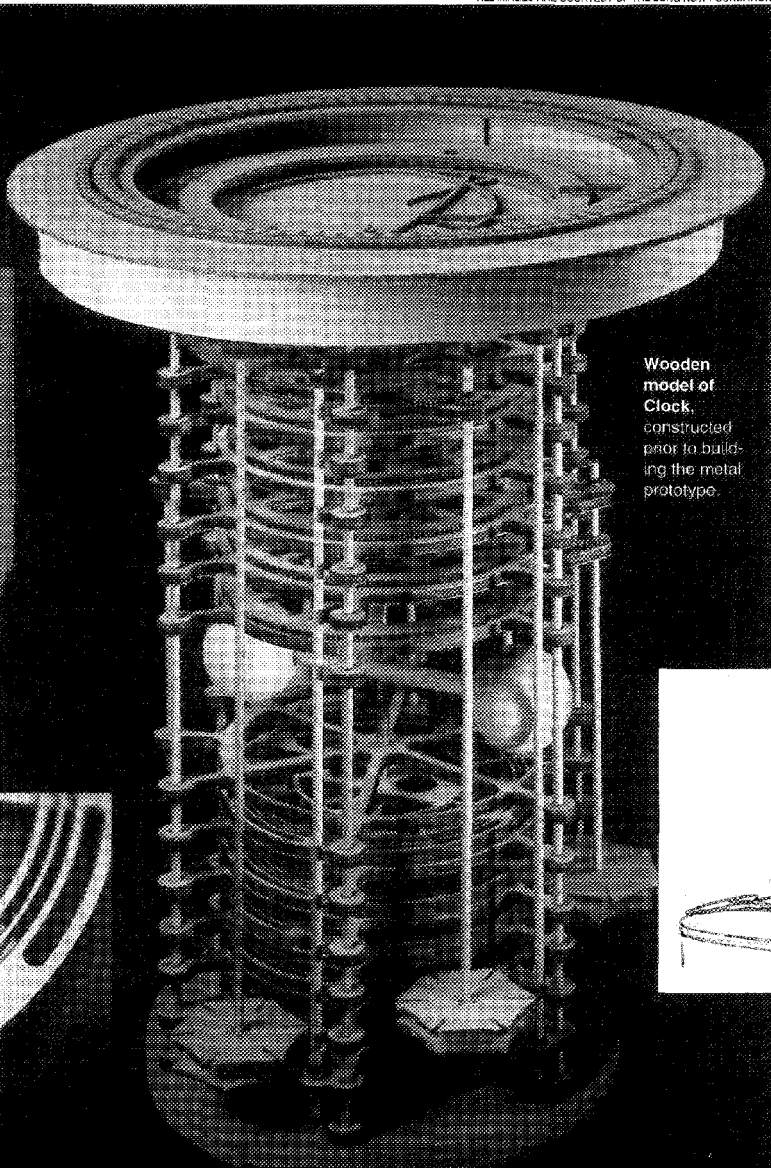
for content to go along with the long-term context provided by the Clock," according to the project summary. In 1996, The Long Now Foundation was established to discuss and develop the Clock/Library. Board members include Peter Schwartz, chairman of the Global Business Network; Paul Saffo of the Institute for the Future; and Stewart Brand, author of a new book about the project, *The Clock of the Long Now*.

Hillis devised the initial mechanical design and prototype of the Clock: It would be self-correcting, and its precision would equal one day in 20,000

Bit serial mechanical adder, designed by Danny Hillis, converts the swing of a pendulum into a highly accurate measured motion, displayed on the Clock face.

ar Clock

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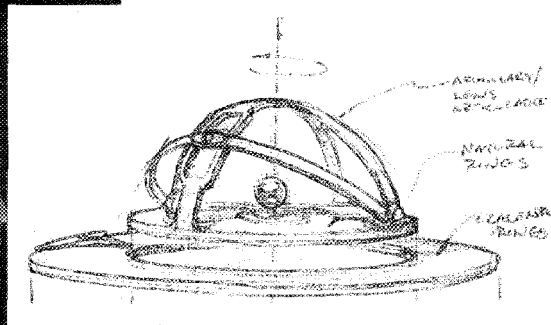
Wooden model of Clock, constructed prior to building the metal prototype.

years, writes Brand. To attain this incredible accuracy, Hillis has come up with a system that combines solar alignment and a pendulum. The pendulum "would keep the Clock close to accurate, and then a pulse of focused sunlight at exact solar noon would adjust the Clock precisely on any day there was sun," Brand explains.

How is a clock—or any artifact—to survive over a period equal to all of human civilization? Among the fundamental design issues Hillis has had to deal with are choosing maintainable materials, making the operational principles obvious (because the device's designers will not always be around to explain it), making the device itself improvable over time as technological know-how evolves, and even keeping it unattractive to thieves and vandals.

The Clock would be a part of a large library complex built in a cave in the mountains near the high desert of the U.S. Southwest. In addition to the Clock, the facility would include a library that constantly increases, "akin to the truly ancient library of Alexandria," as executive director Alexander Rose describes it.

For the present, the Clock exists largely as a discussion thread on the Foundation's Web site; it is both a real project and a metaphor for the "long now"—a view of the present



Sketch of Clock design by Alexander Rose, executive director of The Long Now Foundation, shows positions of the amillary/lens articulation ring (celestial sphere) and the natural and calendar rings.

that is far broader than our current myopia permits. The Foundation invites all to participate in this long-range project by offering suggestions and ideas for the Clock on its Web site.

As a symbol, the Clock may be perceived as a very simple message from the present to the future. As Hillis puts it, "I cannot imagine the future, but I care about it. I know I am a part of a story that starts long before I can remember and continues long beyond when anyone will remember me. I sense that I am alive at a time of important change, and I feel a responsibility to make sure that the change comes out well. I

plant my acorns knowing that I will never live to harvest the oaks. I have hope for the future." □

About the Author

Cynthia G. Wagner is managing editor of THE FUTURIST.

For more information, contact: The Long Now Foundation, P.O. Box 29462, San Francisco, California 94129. Telephone 1-415-561-6582; Web site www.longnow.org.

See also *The Clock of the Long Now: Time and Responsibility* by Stewart Brand. Basic Books, 1999. 190 pages. Available from the Futurist Bookstore for \$22 (\$19.95 for Society members), cat. no. B-2276.

Three-dimensional model of Clock, designed by Danny Hillis.

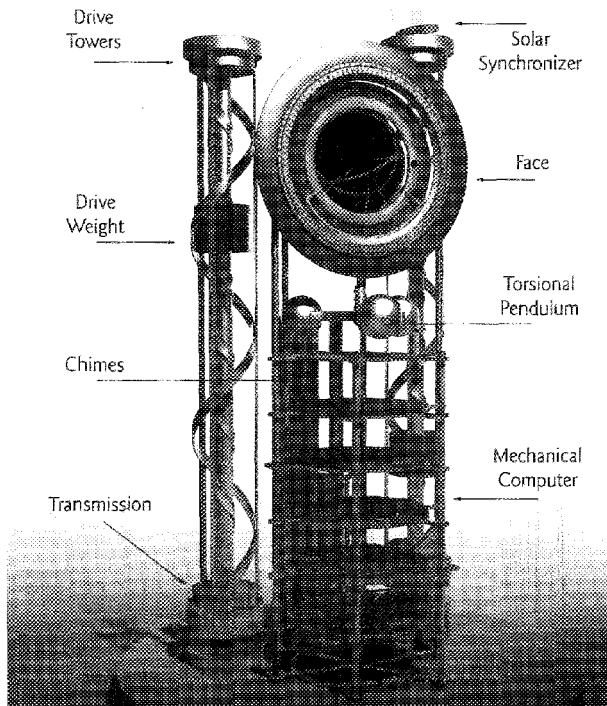
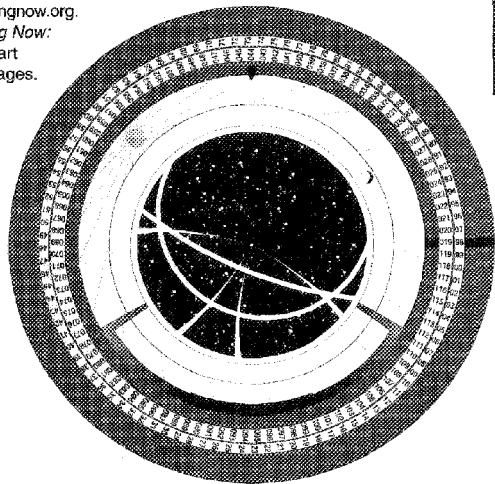


Diagram of the Clock's natural and calendrical rings.

The inner natural rings include the sun and the moon, while the outer calendar rings mark years and centuries.

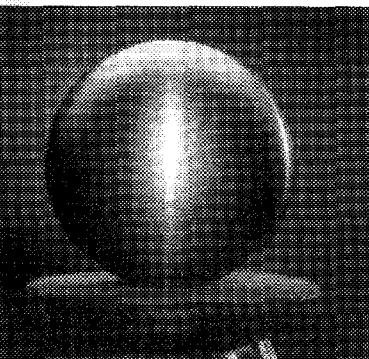


Natural Rings

- Sun Ring: 24 hours/rot (CW)
- Moon Ring: 8 phases and c.29 days/rot(CW).
- ◡ Sunset/rise indicators (dynamic).
- Astrolabe: window 24 hours/rot (CW). starfield processes with equinox c.9417404 days/rot (CCW).

Calendrical Rings

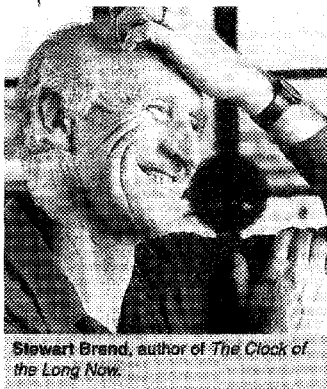
- Century Ring: c.3652421 days/rot (CW).
- Year Ring: c.36524 days/rot (CCW).



Tungsten pendulum bob, a 22-pound sphere made of one of the toughest-known materials. Says inventor Danny Hillis, "Barring a direct hit by a thermonuclear weapon, this artifact should last 10,000 years and then some."

Time and Responsibility

“ Since the soon-to-be outnumber the living; since the living have greater impact on the unborn than ever before thanks to depletion of natural systems, atmospheric disruption, toxic residue, burgeoning technology, global markets, genetic engineering, and sheer population numbers; since our scientific and historic understandings now comfortably examine processes embracing eons; and now that our plan-ahead horizon has shrunk to five years or less—it would seem that a grave disconnect is in progress. Our ever-hastier decisions and actions do not respond to our long-term understanding, or to the gravity of responsibility we bear. ”

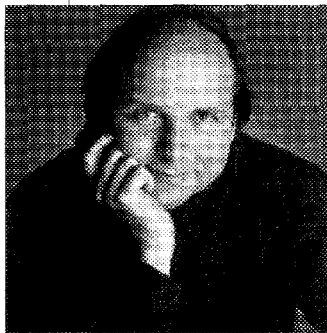


Stewart Brand, author of *The Clock of the Long Now*.

10,000-Year Clock

The Shrinking Future

“ When I was a kid, three decades ago, the future was a long way off. So was the turn of the millennium. But the funny thing is that, in all these years, 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. ”



Danny Hillis, co-founder, The Long Now Foundation.

