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BODY & SPIRIT

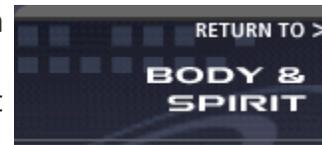
Tick, Tick, Tick

It's about time: contemplating its beginning, its future and our control over it

By GAUTAM NAIK

A group of prominent Americans recently bought a small mountain in eastern Nevada. Within this limestone edifice, they plan to build a most unusual clock: an 80-foot-high device that will bong not every hour, but every century.

The idea is to get people to slow down -- to make them think beyond the usual short-term perspectives brought on by ever-faster technology and the acceleration of everyday living. "The urgent keeps displacing the important in our daily lives," says Stewart Brand, an author and inventor helping to lead the effort.



Mr. Brand is joined in the project by technology guru Esther Dyson, computer scientist Danny Hillis, music producer Brian Eno and other advisers. Financial backers include Bill Joy, co-founder of Sun Microsystems Inc.; Mitch Kapor, founder of Lotus Corp.; and Jay Walker, creator of Priceline.com.

They call this \$10 million project the Clock of the Long Now. It will tick once a year. The cuckoo will come out once every 10,000 years. It will be controlled by "the world's slowest computer." Made mainly of steel, the clock will be an "antidote," Mr. Brand explains, "to our immersion in the immediate 'now.' "

At the threshold of a 1,000-year landmark in human history, it's a good time to think about time. When did it begin? Does it flow from past to future? Is time travel really possible? And, as we get older and feverishly try to cram more into every day, the biggest question of all: Why does time pass so quickly, and is there anything we can do about it?

Scientific Inroads

Surprisingly enough, science has made strides in tackling these questions. Because the theories are difficult and can defy common sense, they have yet to become part of the Zeitgeist. But the gap between daily time -- the one we experience -- and scientific time could start to close.

"A hundred years ago, people said Darwin's theory of evolution was an affront to common sense," says Oxford physicist David Deutsch. In coming years, he predicts, "time will make the leap into human consciousness and feed into the spirit of our age, society and what people think life is for."

That's saying a lot, since most of us still perceive time the way Isaac Newton described it six centuries ago. Time sounded an immutable cadence, he said, flowing "equably, without relation to anything external." This meant that the tides, planets and billiard balls moved along predictable paths, determined by the forces bearing on them. From this view came the belief in the clockwork quality of the universe -- its perfect order, its perfect predictability -- and the image of God the watchmaker.

Einstein shattered this universe. He showed that time wasn't absolute, but can be changed. Time slows down or speeds up under the influence of gravity. It does the same, in a relative sense, when an observer travels at a speed approaching that of light. For example, a passenger in a rocket ship traveling at close to the speed of light will age less quickly, relative to a twin left behind on Earth. The implication continues to defy common sense. One observer said, "It is probably the greatest mutation ever in the history of human thought."

Strange as it seems, the slowing down of time is an everyday event in the world of physics. Consider the muon,

an elementary particle that decays reliably -- like clockwork, you might say -- two-millionths of a second after it is created. Under normal circumstances, it can travel only a few meters before vanishing in a puff of energy. But when hurtled through a particle accelerator at 99.99% of the speed of light, the muon actually "exists" for more than two-millionths of a second and travels for hundreds of meters before decaying. It can do this because, for the muon -- and in relation to the external observer -- time is stretched out.

Time-Travel Research

Many scientists believe the ability to manipulate time might one day have practical uses. The most tantalizing concept is time travel. Physicist Stephen Hawking, in his best-selling book "A Brief History of Time," describes how it's theoretically possible to take a space-time shortcut through "wormholes." Practically, this may be a pipe dream, because the time traveler would have to move at close to the speed of light -- a huge physical hurdle.

That hasn't deterred people from dreaming. In East Northport, N.Y., engineer Dave Anderson runs the Time Travel Research Center, which has 4,000 members and serves as a clearinghouse for the latest research on time travel. Mr. Anderson isn't building a time machine. More modestly, he hopes to manipulate "time fields" on a small scale. One possible application is the preservation of human organs, which decay over time.

A thornier time-related enigma is the "tachyon," a hypothetical particle that can travel faster than light. Its existence is consistent with Einstein's theory of relativity, which holds that the appearance of the world depends on the observer's state of motion. In theory, tachyons could be used to send signals into the past, triggering some weird paradoxes involving time. For instance, an observer could see a tachyonic bullet hit its target before it was actually fired from a gun. Scientists continue searching for proof of the theorized particle, but it hasn't shown up yet.

As in relativity, our daily sense of time is affected by how we measure it. The invention of the mechanical clock seven

centuries ago caused humans to begin living in ever-smaller gradations of days and nights. Now, we set our watches to Big Ben or the beeps on the radio, which, in turn, are tuned to 50 atomic clocks around the world that calibrate the planet's time to millionths of a second. The more closely we track our money, the more we care about it, and the same is true of time.

We now live by "Internet time," "time to market" and "response time." When it all becomes too much, we seek a little "quality time." In business, we treat time as if it were capital, vainly attempting to leverage or manipulate it.

Cramming In Activities

Even if these strategies create value, they don't create time. The CEO wants to safeguard the long-term future of the enterprise -- to make it "built to last," in the phrase of a best-selling business book -- but still makes decisions according to the 90-day clock set by Wall Street. We think nothing of crossing 10 time zones, working split shifts and getting by on an average of barely seven hours of sleep, even though our genes have programmed us for the natural rhythms of light and dark and, therefore, for 8 1/2 hours of slumber.

And we fill those waking times with more activities and more things in the belief that they will create time. In fact, they have the opposite effect. The justly famous "Moore's Law" describes the steady increase in computing speed -- it says the processing power of a microchip doubles every 18 months -- but is there anyone who thinks that faster computers actually slow down the workday? "We are awash in things, in information, in news, in the old rubble and shiny new toys of our complex civilization," writes James Gleick, in his book "Faster: The Acceleration of Just About Everything." "Stuff," he adds, "means speed."

So what's the good of knowing that time isn't immutable? That measuring time changes time? That psychological time is every bit as slippery as physical time? One answer comes from Mr. Brand of the Long Now project: "You can know the past, but can't change it. You can affect the future, but you can't know it." The implication: Only in the present can we

act and know.

In his last major work, "Four Quartets," T.S. Eliot speculated on whether the "arrow of time" -- its apparent movement from past to future -- was illusory. The poem, an exploration of the possibility of life outside of time, echoes Hindu and Buddhist philosophy:

*Time present and time past
Are both perhaps present in time future,
And time future contained in time past
If all time is eternally present
All time is unredeemable.*

Einstein, amazingly enough, made the same assertion in explaining relativity. "The distinction between past, present and future," the great physicist argued, "is only an illusion, even if a stubborn one."

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