TIME

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First Church in Belmont, Unitarian Universalist

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This sermon talks about time by trying to answer four questions:
First question: What can we do about not having enough time for our daily tasks?
Second question: How can we keep time from speeding up as we grow older?
Third question: What does relativity tell about time and aging?
Fourth question – perhaps surprisingly: What it is like to fall into a black hole?

First question: What can we do about not having enough time for our daily tasks? We seem to be frantically busy every day; busyness squeezes out our time to relax and be serene. Our feeling that we do not have enough time for all our activities is called *time famine*. In a *Boston Globe* article, Keith O'Brien reports that researchers have found two ways to overcome time famine, so that we can experience what they call *time affluence*, the feeling of being rich in time, having enough time for everything.

The first way to achieve time affluence is to help someone else. Research shows that it does not matter whether you do the dishes for your spouse or help a friend install a new TV, or volunteer in a hospice facility. Helping some else gives a feeling of time affluence. The reason is not hard to find. Suppose you do only your own tasks. Then you start the day with, say, six things to do. Do one task and five still remain; no feeling of completion and satisfaction. In contrast, if you help someone else, there is just one task; finishing it brings a sense of completion and personal satisfaction. You feel effective and useful and that your time has been well spent. You have stretched your time.

I was surprised by the second way to achieve time affluence, namely to experience the feeling of awe. Researchers show people awe-inspiring footage of a mountain top or waterfall, or ask people to report on an experience of awe they had, or have them read a story about climbing the Eiffel Tower and seeing Paris spread out before them. These experiences help people to live in the present, to appreciate

the moment, and to feel satisfaction. A feeling of awe gives them the experience of time affluence, having plenty of time.

I experience awesome vistas every day as I write a book that describes black holes and the cosmos. But I do not need the book to be continually astonished by life. I am astonished at how athletes can possibly compete at the level that we see. I am astonished at how Shakespeare can produce such matchless prose, or a modern writer create such poetry, or how Bach or Beethoven could compose such deathless works. I am astonished that I can fly from San Francisco to Boston in less than six hours and that I can find almost any item of information in seconds on the web. The awe of astonishment is my constant companion.

So here is our first piece of advice about time: Enjoy time affluence by doing something for someone else, and be in awe.

Second question: How can we keep time from speeding up as we get older? Nowadays time flies for me: Turn around and here comes Christmas again. In contrast, I remember that when I was young a single day crawled by, was almost endless. By bedtime every evening I was exhausted!

Someone explained Einstein's relativity to a friend by saying: "When you are sitting on a hot stove, time goes slowly; when you are kissing the boss's daughter, time goes fast." His friend replied, "Einstein got the Nobel Prize for that?" Actually, he didn't; relativity was too weird for the Nobel Prize committee; Einstein got the Prize for something else.

In the *New York Times*, Richard Friedman reports research on our experience of time's speed. One difference between childhood experience and the experience of an adult is that most days a child is learning something new, often something difficult. Typically the child's day is full of new experiences. Research shows that time moves more slowly for you when you are trying to master a difficult task. In contrast, for most adults the day is full of routine. I get up, go swimming, have breakfast, work on my book, do some other tasks, have supper, watch a movie with Carla, then go to bed. The days fly by. Here comes Christmas again.

The cure for fast time? Be more like a child. Fill each day with a new experience and a difficult task. Here is the final paragraph of Richard Friedman's article:

QUOTE
It's simple: if you want time to slow down, become a student again. Learn something that requires sustained effort; do something novel. Put down the thriller when you're sitting on the beach and break out a book on evolutionary theory or Spanish for beginners or a how-to book on something you've always wanted to do. Take a new route to work; vacation at an unknown spot. And take your sweet time about it.
UNQUOTE

So here is the second piece of advice about time: Every day do something new, preferably something difficult.

Third question: What does relativity tell about time and aging? Relativity has a simple message: There is no single, universal time on which everyone can agree; each of us has his or her own time. My time is different from your time. How is this time measured? Time is measured on our separate wristwatches. Instead of talking about a common time, relativity talks about my wristwatch time and your wristwatch time. Not just every person but also every object wears a wristwatch. Every moving stone wears a wristwatch; every elementary particle wears a wristwatch, and each of these wristwatches runs at a different rate.

Why does your wristwatch time differ from my wristwatch time? Relativity gives two reasons: Special relativity says it is because of relative speed between you and me. General relativity agrees, but to the effects of relative speed, general relativity adds effects of gravity: It says that wristwatches run at different rates when they are at different heights in a gravitational field.

Why don't you and I notice our different wristwatch times in our everyday lives? Because our relative speeds are too small. But there is one everyday use of general relativity in which time difference between wristwatches is important: the Global Positioning System. The Global Positioning System, or GPS, depends fundamentally on both the relative speed of different wristwatches and their different heights in a gravitational field. You carry a wristwatch; each orbiting GPS satellite carries a very accurate wristwatch. Both relative speed between you and the GPS satellite and the difference in your heights in the Earth's gravitational field affect their different measures of the passage of time. General relativity is built fundamentally into the operation of the Global Positioning System; when we do not

use general relativity, the GPS gives useless results. The builders tried the first GPS satellite without using general relativity; it failed miserably, so they turned on the analysis that includs general relativity.

There is another name for wristwatch time: aging. You age with the passage of your own wristwatch time. Maybe you have noticed that you are getting older; I certainly do. The human experience of aging embraces both science and religion. Forrest Church says: "Religion is our human response to the dual reality of being alive and having to die."

The black hole provides an exaggerated case of almost every result of general relativity. As we orbit around or fall into a black hole, our differences of aging due to relative speed and relative position in the gravitational field become huge and unavoidable.

These effects come together in our fourth question: "What is it like to fall into a black hole?" Recently I realized that between two-thirds and three-quarters of our general relativity textbook provides background for answering the question, "What it is like to fall into a black hole?" As you fall, what do you see? What do you feel? Why do you die? Is it a merciful ending? To answer these questions, you need to learn a lot of general relativity: What paths do you and I take as we fall through the curved spacetime around a black hole? What are the trajectories of each ray of light from the stars overhead that enters our eye as we fall? What is there about gravity that kills us?

The answers are fascinating. When you fall into a black hole, your death is quick and almost painless. You are *spaghettified*. Your head and feet are pulled apart by tidal forces, and you are squeezed from side to side. The result: You are turned into a strand of spaghetti. But your discomfort is over in one quarter of a second. This quarter of a second is the same whether the black hole is small or large.

It gets better: As you fall toward the center of a black hole, you have a spectacular, changing panorama of the starry heavens. Catch me at coffee hour and I will describe to you this spectacular panorama, and tell you what is the last thing you see.

Recently I realized why our general relativity book focuses on falling into a black hole. It does not take a psychiatrist to understand the reason if you know about my life. Overall, I have had a very cushy life, except for one day at age 17, when I watched my father fall over an ice cliff to his death. Writing a book about falling into a black hole allows me to replay my father's fatal fall while converting that

trauma into something both fascinating and socially useful. This process is has an awkward technical name. It is called *sublimation*. Sublimation is the process by which we transform a personal compulsion or trauma into something benign and socially useful. I sublimate my father's fall – and also my own approaching death – by writing a relativity book which is mostly about falling into a black hole. Here is second example of sublimation: A mentally healthy Catholic priest sublimates his sexual desire into enthusiastic good works for others. (I said a healthy-minded Catholic priest; unfortunately, not all priests are healthy-minded.) Here is a third example of sublimation: We hear all too often about a child who is abducted and murdered. Sometimes the child's parents then begin to work with other parents who suffer the same catastrophe; occasionally they set up a foundation for that purpose. The parents can replay and *sublimate* the death of their child, yielding both personal and social benefit.

And what about you? Every life has its trauma. We never "get over" a serious trauma; but we can sublimate that trauma into a personal or professional pilgrimage.

For each of us our wristwatch time ends. With luck, our personal time ends due to aging. Time will end not only for you but also -- for everyone who raises a child -- time will end for that child, and for each of your child's children, down the echoing hallways of time. A limited life span means that every new day is precious, an opportunity for each of us to enrich our life and the lives around us. It turns every human encounter into a cosmic event, never to be repeated.

A popular slogan says, "Today is the first day of the rest of your life."

So here is the summary of advice to ourselves about time:

First, find more time in your busy day in two ways: do something for someone else, and experience awe.

Second, slow down your time by doing something new every day, preferably something difficult.

Third, transform every trauma of life, including your trip toward death, by sublimating it into a personally satisfying and socially useful task.

May time be your friend who encourages you to live fully.

Amen

REFERENCES:

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"Fast time and the aging mind," Richard A. Friedman, *New York Times*, July 20, 2013

Forrest Church quote from his introduction to the Beacon Press edition of *The Jefferson Bible*.