CAPITOL IDEAS

Can We Do Without Relativity?

By Tom Bethell from the September 2009 issue

SOMETHING TELLS ME THAT MY NEW BOOK -- *Questioning Einstein: Is Relativity Necessary?* -- is unlikely to be reviewed. So I shall say something about it here. I have been working on it on and off for years, and it is based on the original work of a good friend of mine, Petr Beckmann. A Czech immigrant who taught electrical engineering at the University of Colorado, he wrote a brilliant book called *Einstein Plus Two*. But it was also difficult -- written in the language of mathematical physics. I interviewed him at length, and told him I would write a simpler version. Then, too soon, he died (in 1993). I was able to finish the book with the help of Howard Hayden, who taught physics at the University of Connecticut and who became convinced that Beckmann's criticisms of relativity were right.

Most people know little about relativity theory, but we recognize that it was highly influential and that Einstein's theory somehow rewrote the laws of physics. It is divided into two parts, the special theory (1905) and the more difficult general theory (1916). The generally accepted view is that the special theory has been proven over and over again, while the general theory perhaps can be questioned and retested. In Beckmann's theory, this is more or less reversed. The general theory gives the right answers but by a complicated and roundabout route. Meanwhile a simpler path lay at hand. But the special theory may have to be discarded because the logical consequences of its postulates do not correspond to experimental results.

Here's one way of looking at the subject. We've all heard of the equation E = mc2, saying that the energy of a body is proportional to its mass. It was derived by Einstein using relativity theory. Less well known is that it was derived by him again later, without relativity. He called the later version his "elementary derivation." Relativity wasn't necessary to derive the most famous equation in physics.

Beckmann extends that way of looking at the issue across the board. The physical facts that seem to demand relativity can be explained by classical physics. That is the argument of my book. It is written without math and in plain English; only a few technical terms need to be explained.

It was the Michelson-Morley experiment of 1887, conducted in Cleveland, Ohio, that led to the theory of relativity. If you don't know about that key experiment, then you will after reading my book. (The claim that this experiment led to relativity has lately been challenged, but for decades it was the standard view and I believe it should be still. The dispute does not affect Beckmann's more basic revision of relativity.)

Light is a wave form and so it was widely assumed in the 1880s that there must be a medium for it to wave in. It was called the ether, and it was believed to fill all of space uniformly. As the earth orbited the sun, its passage through the ether should have been detected by the instrument that Albert Michelson had perfected, the interferometer. But no such effect was observed.

Einstein responded with the theory of relativity, positing that the speed of light is a constant and that the ether didn't exist at all. This would explain the Michelson-Morley null result, but then came the general theory, the observed bending of starlight passing close by the sun and the slowing of light as it enters a denser gravitational field. With the general theory Einstein allowed that the constant velocity of light "cannot claim any unlimited validity." Light rays crossing a gravitational field "undergo deflection."

Having reviewed the evidence, Beckmann argued in the 1980s that the earlier assumption of a *uniform* ether was the underlying error. He argued that the ether, or luminiferous medium, really does exist, but is equivalent to the local gravitational field. This field accompanies the earth as it orbits the sun, so the relative motion of earth and ether that Michelson looked for was not to be expected.

But the earth also rotates on its axis, and it rotates *through* its gravitational field, much as a woman's hoop skirt will not rotate around with her body as she does a pirouette (assume a circular waist and minimal friction). If so, then the effect that Michelson-Morley expected to see would be there, just four orders of magnitude smaller than anticipated. This is because the rotational velocity of the earth is much smaller than its orbital velocity.

If the earth rotates through the ether (gravitational field), then there should be a difference in the speed of light east to west and west to east. Beckmann and Hayden offered a $2,000 reward to the first person who could cite any experiment showing there is no such east-west difference. The offer was published in *Science* magazine in 1990 but there were no takers.

The east-west, west-east speed differential is now quite well established. It is the same distance either way, so the time should be the same, too, if light speed is a constant. But when atomic clocks were flown around the world in opposite directions, "the clock that flew toward the east had recorded slightly less time," Stephen Hawking wrote in *The Universe in a Nutshell.* I devote a chapter to the experiment demonstrating this. The time differences are small enough that atomic clocks are needed to detect them.

Readers of Easy Einstein books may have learned that, in Einstein's theory, time is dilated and space contracted in reference frames that are in motion with respect to *the observer*. Has this been observed? Short, stubby spaceships are frequently depicted by artists, but no such contraction has ever been seen experimentally. They represent the triumph of theory over observation.

"Time dilation" has not been observed either. What has been observed is that *clocks* slow down when they move through the gravitational field. When they are moved up to a higher altitude, where the field is thinner, they speed up, much as a jet encounters less resistance (and consumes less fuel) at a greater height. It is not motion with respect to the observer that affects *time*, but motion with respect to the gravitational field that affects *clocks*.

All this gives us a very different and much simpler way of looking at what is going on. There is just the one, universal time-the time that Newton accepted and that we all have known.

TOWARD THE END OF MY BOOK I note that in 1916 Einstein himself restored an ether that seems indistinguishable from Beckmann's. But he become uncomfortable with referring to his new understanding of space as "ether" because he had abolished it in the special theory and then apparently brought it back (although with a different meaning) in the general theory.

The episode is discussed in detail in *Einstein and the Ether*, by Ludwik Kostro (Apeiron, 2000). The book includes Einstein's correspondence with Hendrik Lorentz, not previously available in English. At one point Kostro directly attributes Beckmann's thesis to Einstein: "He expressed the identity of the gravitational field with the ether, among other things, by referring to the latter as the gravitational ether."

Walter Isaacson, in his best-selling biography, also discusses Einstein's revival of the ether, as very few writers have done. Beckmann was not aware of Einstein's revival of an ether that was similar (or identical) to his own.

There is much more, about Mercury's orbit, for example, and the increase of mass with velocity.
Well, dear readers, you will do me a great favor by buying the book. It has been published by a small outfit called Vales Lake Publishing in Pueblo West, Colorado, and I believe it is also available from Amazon.

I like to think that if you tried to read one of those Easy Einstein books, and never could quite figure out what was going on (you have lots of company), you will finally be able to understand it, and perhaps for the first time, in my plain-language version of Petr Beckmann's recasting of Einstein's theory.

Tom Bethell *is a senior editor of* The American Spectator *and author of* The Politically Incorrect Guide to Science, The Noblest Triumph: Property and Prosperity Through the Ages, *and most recently* Questioning Einstein: Is Relativity Necessary? *(2009).*