letters

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More on Einstein papers

The letter by E. J. Post (June, page 11) refers to Einstein's recognition of the need for distinguishing between two distinct vacuum speeds of light.

This can be stated as the following principle: The speed of light relative to the local Lorentz frame is constant (1, in geometrized units), but the speed relative to a global frame is not constant ($\neq 1$ in general), except in the limiting case of special relativity (flat space–time).

In particular, the vacuum speed of light relative to the solar system (a global frame) is $1 + V$, where V is the gravitational potential (to close approximation), indicating how a ray of light slows down in passing the Sun, and why it is necessary to allow a modification in Einstein's original statement of the principle of the constancy of the vacuum speed of light.

Kenneth J. Epstein
7/82 *Chicago, Illinois*

The author comments: Permit me to add to Epstein's observation that Einstein discussed this very issue in 1911 (Annalen der Physik **35**, page 898). From the finite gradient of the speed of light he calculated the refractive gravity-bending of light. The actual bending, later predicted by his general theory, is twice this amount and *happens* to equal the sum of two identical contributions in the sense of a particle-wave duality: wave refraction through gravity and gravity pull on photons. This double deflection is now believed to be reasonably well confirmed by observations as a genuine effect of gravity—rather than as an outer-atmosphere effect of the Sun.

Now with all this evidence militating

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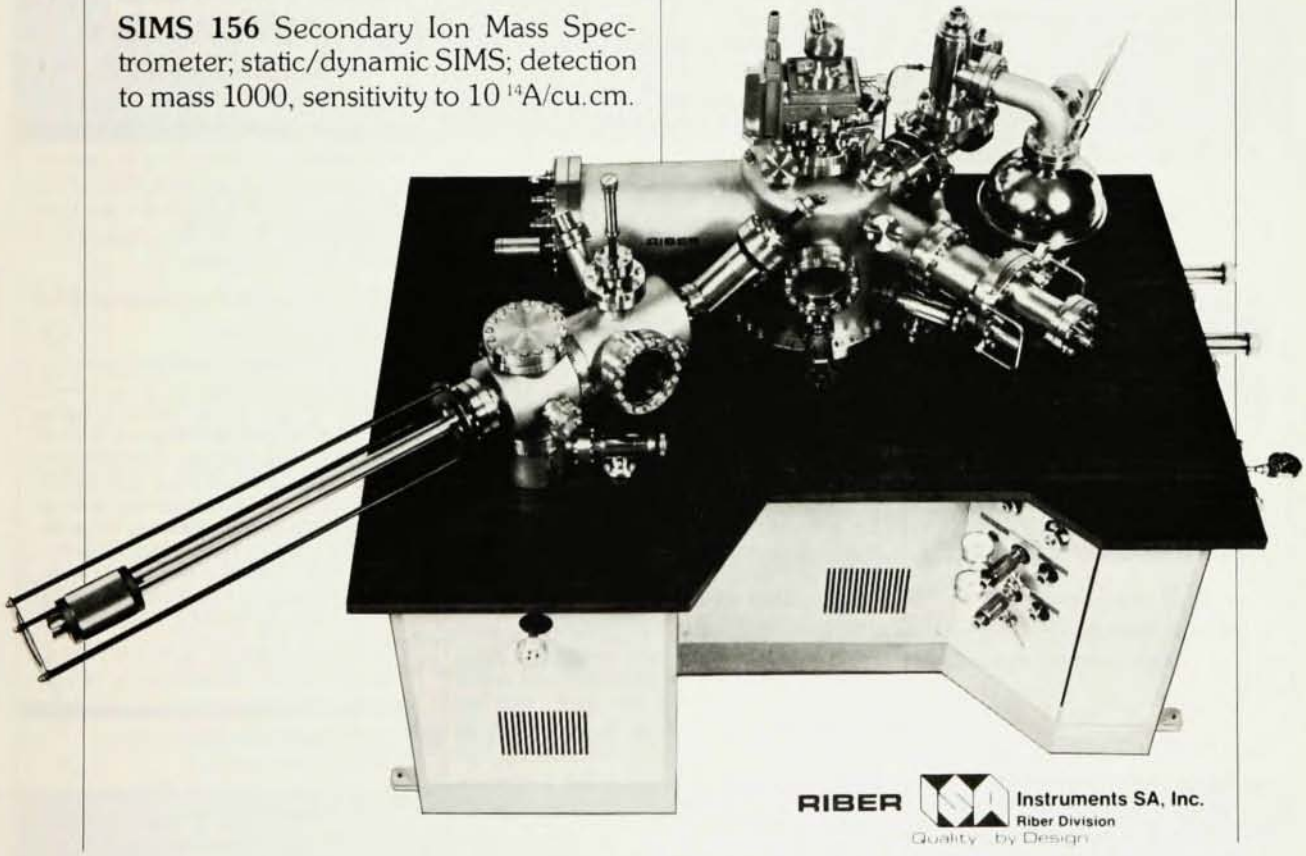

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letters

against the universal constancy of the speed of light in vacuum, how do we explain this modern preoccupation with local "physical frames" sharing a common speed of light which exists *at best* as a theoretical extrapolation?

One wonders whether such abstraction might have been accepted had the original sources been more readily available. All of which reemphasizes the need for the Einstein papers, starting from the premise that the present student body is entitled to a personal comparison between the original sources and their contemporary versions.

Was it not Andrew Carnegie who wanted to do away with all inheritance of personal property over and beyond meeting the immediate and basic needs for the next of kin? How well perceived by old Andrew! It shows the law is too important to be left to lawyers alone. Now that I come to think of it: In physics we have learned to live with a fair measure of outside safeguards against professional inbreeding!

So lawyers, show us your one-upmanship by getting us *the complete collection of all previously published Einstein papers*. Please no unpublished notes or private correspondence, they belong with the executor, and please no retainer, just courtesy service; this litigation has been costly enough for a long time to come.

E. J. Post
7/82 *Plaza del Rey, California*

Research at small colleges

George Duvall's comments on the role of faculty physicists at small colleges (May, page 118) present a view that is at variance with our experience as a foundation supporting basic academic physics research at both colleges and universities. His view conceives of teaching in the narrow pedagogical sense as the sole proper role of small-college physicists, with serious research being incompatible with the college setting.

In fact many college physicists, with administrative support, opt for a college-based career that includes research for a variety of legitimate personal and professional reasons. They realistically accept that certain areas of modern physics research will be closed to them, but they intend to participate in active research out of at least two motivations. One is the joy and gratification of "doing physics"; the second is the opportunity to integrate undergraduate students into their research as a means of accelerating their maturation as physicists and facilitating their acceptance into the