letters

not sympathetic with Kierein's plaint that "you can imagine how difficult it is for people who are not in the club!" I am confident that all his scientifically valid papers will be published.

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KIEREIN REPLIES: Since Galileo, science has progressed more through observation than calculation; hence Edwin Hubble's book *The Observational Approach to Cosmology*. I can calculate that light traveling through air would have image blurring and spectral line broadening. The photons interact strongly with air molecules; their velocity is measurably slowed according to the index of refraction. Calculations of the greater path length traveled at *c in vacuo* that corresponds to the slower velocity in air would show that the photons have deviated from a straight line path, producing blurring! Thermal motion of the molecules would cause line broadening. But observations show no such blurring or broadening. Why? Perhaps the scattering centers act as centers of Christian Huyghens's secondary wavelets that reconstruct the wavefront! No such considerations were given by any of the referenced calculations.

Jay Pasachoff and Joseph Silk claimed that James Brault's observations of the solar sodium D_1 line could not be explained by Compton scattering and that it showed no appreciable center-to-limb variation.[1] This is simply not true. Brault's data do show a center-to-limb variation.[2] One wouldn't expect this variation to be great, since this line "is emitted high in the Sun's atmosphere"; the variation in path length traveled through the Sun's atmosphere would not be as great as for a line emitted from lower down.

For multiple Compton scatterings to cause the redshift, longer-wavelength photons must undergo more scatterings than shorter-wavelength photons. The observed shift is proportional to the wavelength, whereas the shift per scattering is independent of wavelength. It is reasonable that the photon's cross section be proportional to its wavelength. The resultant variation of index of refraction with wavelength prompted Grote Reber to suggest that any extragalactic pulsar discovered should exhibit dispersion.[3]

The controversy may be solved by finding "nearby" quasars using parallax measurements. Very long-baseline interferometry *observations* have shown proper motion between the quasars 3C 345 and NRAO 512.[4] A parallax interpretation would indicate that one of these is as near as 15 000 parsecs away, assuming the other is a background object.[5] Since both quasars may be nearby, they could be much closer than that! Their proper motion could even be co-orbital. Of course, they could also be farther away if their relative motion is a significant fraction of *c*. More such observations are needed.

The observed correlation between light traveling through electron clouds and the corresponding redshift is so strong that the Compton effect must be considered as its cause. This is much more reasonable than Big Bang cosmologies, superluminal quasar jets, star-sized quasars with ordinary stellar temperature spectra releasing more energy than several galaxies, radio objects extending over hundreds of millions of light years and other inconceivably complex objects conjured up to comply with Doppler redshift interpretations.

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Correction

January, page 84—The address of the supplier of FORTRAN subroutines is Lektor, P. O. Box 6713, Kennewick, Massachusetts 99336. □