CORRESPONDENCE

To the Editors of 'The Observatory'

Why stop at ⅔?

In the discussion of Professor Turner's talk, Rev. Barber states[1] that "the age of the Universe could be derived from any multiple of the Hubble constant from ⅔ onwards." (Presumably he means the Hubble time, not its inverse, the Hubble constant.) In the Einstein–de Sitter universe, with $\lambda = 0$ and $\Omega = 1$, the age is ⅔ of the Hubble time, which is presumably why Barber mentions this fraction. However, this is not a limiting value; except for the fact that there is a region of the λ–Ω parameter space in which the age of the Universe is infinite (*i.e.*, there is no Big Bang), the age of the Universe expressed in units of the Hubble time is a very well-behaved function of λ and Ω with no lower bound, neither at ⅔ nor at any other value (*e.g.*, Fig. 3 in ref. 2). (The value of 0 occurs for infinitely large (absolute) values of λ (which is negative in such cases) and/or Ω (if only one (absolute) value is infinitely large, the other is 0).) To be sure, an age of the Universe of less than ⅔ the Hubble time implies $\lambda < 0$, $\Omega > 1$ or both. Since the discussion is concerned with the possibility to "kick in an arbitrary Λ dark energy", it seems strange to constrain λ to be greater than 0 and Ω to be less than 1. Of course, cosmologists are now reasonably certain[3] that $\lambda \approx 0{\cdot}73$ and $\Omega \approx 0{\cdot}27$ (and these seem to be the result of a real convergence, not just the popular values *du jour*[4]), but in a general discussion of what could be, rather than what is, it is important to remember that there is no theoretical reason to exclude $\lambda < 0$ or $\Omega > 1$.

Yours faithfully,
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2012 March 03

References

(1) Meeting of the Royal Astronomical Society, *The Observatory*, **132**, 64, 2012.
(2) P. Helbig, *MNRAS*, **421**, 561, 2012.
(3) E. Komatsu *et al.*, *ApJS*, **192**, 18, 2011.
(4) R. A. C. Croft & M. Dailey, *MNRAS* (submitted), arXiv:1112.3108.