

RELATION OF A CONTRACTING EARTH TO THE APPARENT ACCELERATIONS OF THE
SUN AND MOON

R.A. Lyttleton

Institute of Astronomy, Cambridge, England and Jet Propulsion
Laboratory, Pasadena, California, U.S.A.

ABSTRACT

The tidal theory of the evolution of the lunar orbit has remained inconsistent with the observational values of the apparent secular accelerations of the Sun and Moon since it was first developed by Jeffreys in 1920. Allowance for a changing moment of inertia of the Earth enables the discrepancy to be completely removed if a decrease is occurring at a rate of just about the amount already required by the phase-change theory of the nature of the terrestrial core. The agreement of the resulting theory with the latest determinations of the lunar acceleration increases confidence in the phase-change hypothesis. On the other hand the theory renders it most unlikely that a changing constant of gravitation will prove necessary to account for the observations. On the present theory of itself the Moon would have been extremely close to the Earth only about 10^9 years ago which suggests that some additional process may at times have influenced the lunar orbit.

The full text of this paper will appear in "The Moon"