# LETTERS TO THE EDITOR

## ASTRONOMY

### A Comparison of Terrestrial and Universal Expansion

Prof. L. Egyed has recently summarized[1] a number of hypotheses concerning the expansion of the Earth, and has suggested that the Earth's radius is expanding at a rate of 0·5–1·0 mm per year.

There appears to be a remarkably close agreement between the rate of increase of the Earth's radius and that of the universe according to Hubble's law. Using the at present accepted value for Hubble's constant, $H = 100$ km/s/megaparsec[2], which is $1{\cdot}65 \times 10^{-4}$ mm per year per mile, and substituting the value of the Earth's radius in the Hubble equation, $v = RH$, we obtain a radial expansion for the Earth of 0·66 mm per year.

While this agreement may be fortuitous it may suggest a fundamental concordance between expansion processes in the Earth's core and those responsible for the expansion of the universe.

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[1] Egyed, L., *Nature*, **197**, 1059 (1963).
[2] Struve, O., and Zebergs, V., *Astronomy of the 20th Century*, 469 (The Macmillan Co., New York and London, 1962).

## ASTROPHYSICS

### Change in Rotation Period of Jupiter's Decameter Radio Sources

The hypothesis that Jupiter's decameter radio sources may have a constant period has been widely accepted since its initial independent suggestion by Gallet[1] and by Burke[2]. Estimates of this period have been made by many observers[1–8], and no significant departures from the adopted mean period (System III (1957.0)—9h 55m 29·37s) have been established. Upper limits of ± 2s to yearly fluctuations and of ± 1s to slow secular changes over an eleven-year period, 1950–61, were set by Douglas[7,8] and Douglas and Smith[9]. The apparent constancy of the rotation period, together with a constant difference in longitude between the three apparent activity regions, has supported the hypothesis that the radio sources are related to the non-gaseous body of the planet, perhaps through Jupiter's magnetic field.

Preliminary analysis of 22·2-Mc/s observations made at Bethany Observing Station of the Yale Observatory in 1962 and 1963 indicates that the rotation period of the radio sources has lengthened by approximately 0·8s. This may be demonstrated in two ways. Fig. 1 depicts the number of occurrences of Jupiter activity for each 5° interval of System III (1957.0) longitude of central meridian, for the years 1961, 1962 and 1963 (to July 7). A progressive drift in longitude of the major peak of approximately 10° per year is readily visible, corresponding to a 0·8s lengthening of the period. Fig. 2 is a Whittaker periodogram plot of the same material for a variety of assumed periods. The 0·8s lengthening is clear, and not explainable by statistical fluctuation. A change in the rotation period of the radio sources from approximately 9h 55m 29·4s to approximately 9h 55m 30·2s sometime in 1960–62 is consistent with the observations, a behaviour reminiscent of the abrupt changes in rotation period exhibited by the red spot. Detection of so small an effect has been made possible by the profusion of Jupiter events recorded in the past three years, due to a substantial increase in Jovian activity, coupled with a new tracking antenna system. Previous period changes of this magnitude or smaller cannot be ruled out, as noted in the limits already quoted. It should be noted that a slow or fluctuating change in rotation period may also be consistent with present observations, as is a change in

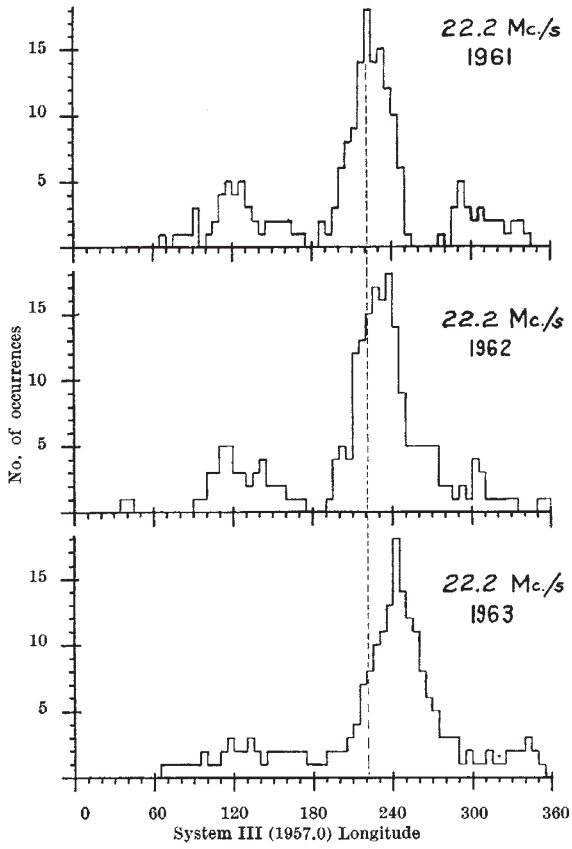


Fig. 1. 22·2-Mc/s occurrence frequency histograms, obtained at the Bethany Observing Station of the Yale Observatory, 1961–63

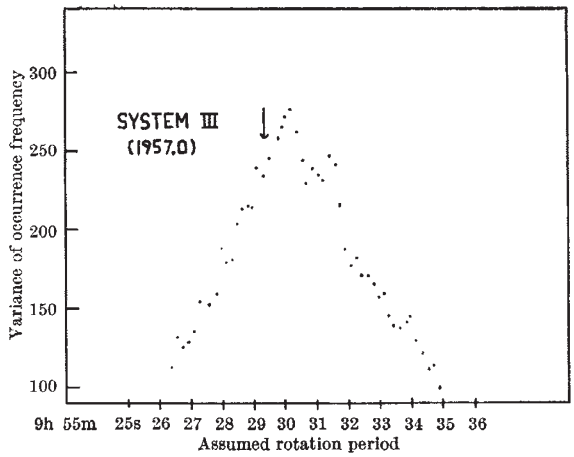


Fig. 2. Periodogram of 22·2-Mc/s Jupiter observations, 1961–63, showing deviation from System III (1957.0) period