

# PRECISE REDUCTION TO THE APPARENT PLACES OF STARS\*

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**Abstract.** For a precise reduction to the apparent places of the stars in a uniform system during the 19th and 20th centuries, the 'Solar Coordinates 1800–2000' by Herget (*Astron. Papers* 14, 1953) may conveniently be used, because no coordinates of the Sun, referred to the mean equinox of 1950.0, are given in the Astronomical Ephemeris before 1930.

A maximum difference of 0".0003 was found between the aberrations calculated from both the Astronomical Ephemeris and Herget's Tables for the period 1960–1969, taking into consideration the effect of the outer planets, which amounted to 0".0109.

The effect of the inner planets on the aberration is estimated to be of the order of 0".0001 at the most and the correction for the lunar term due to the change in astronomical constants is 0".00002. It is recommended that the solar coordinates be calculated directly from Newcomb's formulae taking the effects of all the planets into consideration, but the effect concerned with the Moon can be neglected.

## DISCUSSION

*Lederle:* The discrepancies found in the solar coordinates are of the same order of magnitude as the precision limit of both Newcomb's expressions and tables. It is therefore questionable whether one reaches a real improvement by the proposed corrections.

*Yumi:* I accept your point, as otherwise anyone could expand the theory independently of Newcomb. We could, however, confirm in what way we can obtain the apparent places of the stars in a uniform system throughout a long period of time, including a period before 1930.

It should be noted, however, that the longitudes of Venus and Jupiter given in Newcomb's Table might have an error amounting to 0".07, the details about which will be written by H. Kinoshita of the Tokyo Astronomical Observatory in a forthcoming paper.

*Lederle:* The aberration vector ( $\Delta R$ ) has to be applied to a unit vector, and the expression on the right hand side of Equation (12) should therefore be multiplied by a rectification factor before  $\Delta R$  is added, if full correctness is claimed.

*Yumi:* There is no problem because the calculation is actually made as you mentioned.

\* The full text of this paper will appear in *Publications of the International Latitude Observatory, Mizusawa IX*.