

In the *Researches on the Motion of the Moon*,\* to be presented in Appendix II of the Washington Observations for 1875, it is shown that the large deviations of Hansen's lunar tables from observations will almost entirely disappear by substituting for the empirical term an empirical alteration of the other term due to the action of Venus, and by making suitable alterations in the elements of mean motion. The entire secular and long period corrections may be formulated as follows: Put

$$V_2 = 21''.47 \sin (8 V - 13 E + 274^\circ 14').$$

(The empirical term.)

$$A = 18 V - 16 E - g.$$

T = time after 1800.0, counted in centuries.

Then the sum of the corrections in question is:

$$- V_2 - 1''.14 - 29''.17 T - 3''.76 T^2 - 15''.5 \cos A.$$

For the present purposes, the most convenient way of applying these corrections is to omit Table XLI, Arg. 30, which contains  $V_2$ , and to replace it by the sum of the above terms, omitting the first; this sum being tabulated as a function of the time. Table XLI, however, contains the constant  $21''.49$ , which will be omitted with the table, and must therefore be applied in the new table. The quantity by which table XLI must be replaced is therefore

$$20''.35 - 29''.17 T - 3''.76 T^2 - 15''.5 \cos A.$$

this is to be reduced to Hansen's units by being multiplied by the factor 212.6. The result is shown for the beginning of each tenth year of the present century, and interpolated to every year from 1880 to 1900 in the first of the following tables.

This is followed by a corrected table XXXIV, in which the term

$$0''.335 \sin (2 g - 4 g' + 2 w - 4 w'),$$

is removed and replaced by

$$- 0''.285 \sin (2g - 4 g' + 2 w - 4 w'),$$

conformably to the results given on p. 439 of Hansen's *Darlegung*. Reducing the correction to Hansen's units, it is

$$- 131 \sin (2 g - 4 g' + 2 w - 4 w').$$

This quantity being tabulated and applied to Hansen's Table XXXIV, we have the corrected table here given.

No further corrections than these are now proposed, because they would of necessity, in the present state of the lunar theory, be purely provisional, and would prove a source of trouble in revising the theory.

With these corrections it is intended to employ Hansen's Tables in the American Ephemeris for 1883.

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\* Abstract in Silliman's Journal for November, 1877.