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第 9 卷

異星等高度經度法

(北緯 0° - 20°)

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BULLETIN

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HYDROGRAPHIC DEPARTMENT,  
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VOLUME IX.

Determination of Time (Longitude) by Method of Equal Altitudes of  
Different Stars, and a Preparative Table for the North Latitudes 0°-20°.

By  
Y. TUKAMOTO,  
NAVAL ENGINEER.

昭和 15 年

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Hydrographic Department





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## PREFACE.

The present volume contains a preparative table of time (longitude) determination by equal altitudes of different stars for the north latitudes from  $0^{\circ}$  to  $20^{\circ}$ , which was accomplished by Y. Tukamoto, Naval Engineer.

This preparative table is a direct continuation of similar tables available for the north latitudes  $40^{\circ}$ — $60^{\circ}$ , by T. Nakano, and  $20^{\circ}$ — $40^{\circ}$ , by M. Kamensky, given in the volumes III and IV of this *Bulletin*, and these three tables taken together might facilitate to a considerable degree the time (longitude) determination in any north latitude from  $0^{\circ}$  to  $60^{\circ}$ .

S. KOIKE,

Vice-Admiral and Chief Hydrographer,

*Hydrographic Department,*

*Imperial Japanese Navy.*

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### § 1. General Statement.

The present issue has as its main object the publication of a preparative table for time or longitude determination by equal altitudes of different stars for the north latitudes 0°—20° and for the epoch 1950.0.

The determination of time by equal altitudes of a single celestial body on both sides of the meridian was practised from pretty old times in preference to that by a single altitude. The drawback of the first named method however is that it requires for its performance a considerable interval of time, during which the constants of the instrument and the atmospheric refraction are liable to change.

This defect can be obviated, all its merits being practically retained, if we observe in a short interval of time equal altitudes of two different stars properly selected on both sides of the meridian, instead of those of a single body. This method was first theoretically and practically completed by Prof. N. Zinger in his work: *Die Zeitbestimmung aus correspondirenden Höhen verschiedener Sterne*, 1874. Its historical development is given by Prof. M. Kameusky in the volume III of this *Bulletin*, p. p. 1—3.

### § 2. Fundamental Conception.

Let  $T_1$  and  $T_2$  be the observed chronometer times of transit of the two stars (1) and (2) at different azimuths over a horizontal wire of a universal instrument supposed to be perfectly leveled. Let next  $\alpha_1, \delta_1$  and  $\alpha_2, \delta_2$  be the right ascensions and the declinations of the above two stars respectively, and  $\varphi$  the latitude of the place of observation. Lastly let  $\Delta T$  be the correction of the chronometer to the local sidereal time, and  $z$  the common zenith distance at which the stars are obser-



ved as above, assuming the atmospheric refractions to be wholly equal for the two cases. We have then the relations:

$$\begin{aligned} \cos z &= \sin \varphi \sin \delta_1 + \cos \varphi \cos \delta_1 \cos (T_1 + \Delta T - \alpha_1) \\ &= \sin \varphi \sin \delta_2 + \cos \varphi \cos \delta_2 \cos (T_2 + \Delta T - \alpha_2) \end{aligned}$$

Hence we have:

$$\begin{aligned} \sin \varphi \sin \delta_1 + \cos \varphi \cos \delta_1 \cos (T_1 + \Delta T - \alpha_1) \\ = \sin \varphi \sin \delta_2 + \cos \varphi \cos \delta_2 \cos (T_2 + \Delta T - \alpha_2) \dots\dots\dots(1) \end{aligned}$$

If  $\varphi$  be known, the determination of the sole unknown  $\Delta T$  is possible from the equation (1). Thus, observing the times of equal altitudes of two different stars at a known latitude, we can theoretically determine the chronometer correction. This is the fundamental conception of the method.

The superiority of this method lies in the following points.

(1) The value of the zenith distance  $z$  at which the two stars are observed does not enter into calculation, and no careful reading of the vertical circle is therefore indispensable, so that the time determination by this method is quite free from the reading errors and from the graduation errors of the vertical circle.

This merit is not to be overlooked especially in observations with a small instrument.

The circle may be roughly graduated, as it serves only to bring the proper stars to the telescope field.

(2) The result obtained by this method is free from the uncertainty of the atmospheric refraction, provided that the amounts of refraction in the two different azimuths, in which the two stars are observed, be assumed to be equal during only a short interval of time.

(3) For executing the observation, a specially solid pier is not necessary.

The observer is only required to care to take the level readings in nearly the same position in the observations of the two stars, in order to be able to reduce the observed times for the level change of the instrument. The only condition requ-

ired for the instrument in performing the proposed method is that the level is reliable and sufficiently sensitive, and that it can be brought into a rigorous combination with the telescope during the observation.

§ 3. Selection of Stars.

Now in actual operations in field, the assumed latitude  $\varphi$  is generally subject to an error of a certain amount. In selecting the pair of stars, the first care must therefore be taken to minimize upon the determination of time the effect of an error of the assumed value of latitude.

Differentiating the equation (1) with respect to  $\varphi$  and  $\Delta T$ , we get after some transformations:

$$d\Delta T = \frac{\tan \frac{1}{2}(A_1 + A_2)}{\cos \varphi} d\varphi \dots\dots\dots(2)$$

where  $A_1$  and  $A_2$  are the azimuths, reckoned from either the south or the north, of the two stars (1) and (2) respectively. If, in the equation (2) we regard  $d\varphi$  as an error of the assumed value of latitude,  $d\Delta T$  may be regarded as resulting error of the time determination. Thus we see that the latitude error does not affect the time determination much, when we have nearly the condition:

$$\tan \frac{1}{2}(A_1 + A_2) = 0$$

or when

$$A_1 + A_2 = 360^\circ$$

The two stars must therefore be observed *in positions symmetrical in azimuth with respect to the meridian.*

Again, in order to diminish the effect of any unavoidable error in the assumed equality of the zenith distances of the two stars, we must observe the stars when they are as *near to the prime vertical* as possible, as can be inferred from the general theory of errors of time determination by altitude. But in this respect



the azimuth may practically deviate from the prime vertical within  $40^\circ$  on its either side, provided that the deviations of the two stars take place to the same side, north or south, and in nearly the same amount.

In order to observe two stars nearly on the above conditions and in a short interval of time, we must select two stars of *nearly equal declinations*. The difference of declinations may practically amount to  $2^\circ$  or  $3^\circ$ , without diminishing the accuracy very much.

Lastly the zenith distance at which the two stars are observed should be neither too small nor too large. If it is too small, we have a great inconvenience not only from a too steep elevation of the telescope, but also from a comparatively quick change of the star's azimuth. If it is too large, there may happen some inequality of the atmospheric refractions for the two stars, which would affect our result almost directly. The zenith distance is generally limited between  $20^\circ$  and  $70^\circ$ .

To fulfil all the conditions as above mentioned, the declinations of the two stars to be formed into a pair, as well as the difference of their right ascensions must lie between certain limits to be determined by the range of latitude for which the pair is to be available.

The star-pairs given in this volume, are selected in such a manner that the following conditions are satisfied as nearly as possible.

|                               |  |
|-------------------------------|--|
| $-35' < \varepsilon < 35'$    | $\varepsilon$ ; Half of the difference of the declinations of the pair |
| $20^\circ < z < 70^\circ$     | $z$ ; Zenith distance  |
| $230^\circ < A_E < 310^\circ$ | $A_E$ ; Azimuth of the east star                                       |
| $50^\circ < A_W < 130^\circ$  | $A_W$ ; Azimuth of the west star                                       |
| $2 < M < 4$                   | $M$ ; Magnitude of star  |

The last condition is to beware of magnitude error, which may be produced in the observation of very brilliant or faint stars.

#### § 4. Formulas for Calculating the Data in the Tables.

Let  $a_E$  and  $a_W$  be the right ascensions of the east and the west stars respectively, and  $\delta_E$  and  $\delta_W$ , their respective declinations. Further put:

$$S' = \frac{1}{2}(a_E + a_W) \quad \delta = \frac{1}{2}(\delta_E + \delta_W)$$

$$t = \frac{1}{2}(a_E - a_W) \quad \varepsilon = \frac{1}{2}(\delta_E - \delta_W)$$

$$K^m = \frac{\varepsilon'}{15 \sin t}$$

$$S_0 = S' + K^m (\tan \delta \cos t)$$

Then we shall have the moment  $S$  for any latitude  $\varphi$ , at which the altitudes of the two stars become equal, by the following formula:

$$S = S_0 - K^m (\tan \varphi)$$

The common zenith distance  $z$  at this moment is calculated by:

$$\cos z = \sin \varphi \sin \delta + \cos \varphi \cos \delta \cos t$$

and the azimuth  $a$  of the fictitious star with the declination  $\delta = \frac{1}{2}(\delta_E + \delta_W)$  by:

$$\cot a = \sin \varphi \cos t - \cos \varphi \tan \delta \operatorname{cosec} t$$

Lastly the azimuth of the east star at the moment  $S$ , counted from the south towards the east will be:

$$a_E = a + 15 K^m \sec \varphi$$

and that of the west star, counted from the south towards the west will be:

$$a_W = a - 15 K^m \sec \varphi$$

The values of  $z$ ,  $a_E$ ,  $a_W$ , as calculated by the processes shown above, are those for the moment  $S$  at which the two stars are at exactly the same zenith distance. As it is however impossible to observe them simultaneously at this moment, we arrange, our data so that we observe the first star ( $E$ . or  $W$ . star)  $2\frac{1}{2}$  minutes before, and the second star ( $W$ . or  $E$ . star)  $2\frac{1}{2}$  minutes after, the moment  $S$ , when the two



stars simultaneously attain the same altitude. For this purpose we computed the variations of the zenith distance  $z$  and the azimuths  $a_E$  and  $a_W$  in  $2\frac{1}{2}$  minutes of time, according to the formulas:

$$dz' = 15 \cos \varphi \sin a \, dt^m$$

$$da' = 15 (\sin \varphi + f \cos \varphi) \, dt^m$$

where

$$f = \cos a \cot z$$

For the accuracies of the final data aimed at, as above mentioned (about 1' for  $z$  and 2' for  $a$ ), it is sufficient to assume for  $a$  its mean value calculated by the formula:

$$\cot a = \sin \varphi \cot t - \cos \varphi \tan \delta \operatorname{cosec} t$$

in calculating  $dz'$  while in calculating  $da'_E$  and  $da'_W$ , it is not necessary to take for  $f$  the different values for the east and west stars, and may be computed by the mean value of  $a$  and  $z$

$$f = \pm \cos a \cot z$$

It is only for the epoch 1950 0 that we can assign the accuracies just mentioned to the quantities given in the table II. For other epoch these quantities change in consequence of precession. Although all these changes may be comparatively small, it is nevertheless very desirable to have them tabulated.

Taking, as the basis of deduction, the formulas for precession:

For the  $E$ . star

$$\Delta a_E = 46.''1 + 20.''0 \sin a_E \tan \delta_E$$

$$\Delta \delta_E = +20.''0 \cos a_E$$

For the  $W$ . star

$$\Delta a_W = 46.''1 + 20.''0 \sin a_W \tan \delta_W$$

$$\Delta \delta_W = +20.''0 \cos a_W$$

and putting:

$$S' = \frac{1}{2}(a_E + a_W)$$

$$\delta = \frac{1}{2}(\delta_E + \delta_W)$$

$$t = \frac{1}{2}(a_E - a_W)$$

$$\varepsilon = \frac{1}{2}(\delta_E - \delta_W)$$

we get, after some deductions and neglecting terms of higher orders in comparison

with those of the first order, the following formulas:

$$\Delta \delta = +0.''33 \operatorname{csc} S' \cos t$$

$$\Delta \varepsilon = -0.''33 \sin S' \sin t$$

$$\Delta K^m = -0.''022 \sin S'$$

$$\Delta S' = +0.''051 + 0.''022 \tan \delta \sin S' \cos t$$

From these expressions, we can easily deduce the following expressions of the annual variations of  $S$ ,  $z$ ,  $A_E$  and  $A_W$  due to precession:

$$\delta S = +0.''051 + 0.''022 \tan \varphi \sin S'$$

$$\delta Z = -0.''33 \cos S' \cos a$$

$$\delta A_E = -0.''33 \cos S' \sin a \cot z + 0.''33 \sec \varphi \sin S'$$

$$\delta A_W = +0.''33 \cos S' \sin a \cot z + 0.''33 \sec \varphi \sin S'$$

putting, for the sake of brevity,

$$a_1 = +0.''33 \sin a$$

$$a_2 = +\cos S' \cot z$$

$$a_3 = +0.''33 \sec \varphi \sin S'$$

we have the following expressions.

$$\delta A_E = -a_1 a_2 + a_3$$

$$\delta A_W = +a_1 a_2 + a_3$$

By above formulas, the tables of this volume were computed, and the author expresses sincere thanks to *Y. Yamazaki*, Assistant, *Hydrographic Engineer*, and *Miss N. Kondō*, who have computed these laborious tasks with wonderful rapidity.

#### § 5. Method of Observation.

(a) The instrument to be used for the purpose may be a universal instrument of any type. It must however be provided with a reliable and tolerably sensitive level, paralleled to the vertical circle, which can be brought into firm connection with the telescope in any position at will. For this respect a Talcott's level attached to the horizontal axis would meet the purpose best. Again the



telescope ought to be provided with a certain number of horizontal wires and two or three vertical wires in the middle of its visible field. It is found very expedient from experience to have five horizontal wires with intervals 2'.

(b) Set the instrument upon a tripod or better upon a solid pier, and level it as usual. Observing the Polaris, determine roughly the reading of the horizontal circle, when the telescope is turned to the south (or north), *i. e.* the reading corresponding to the azimuth  $0^\circ$ . If possible, adjust the horizontal circle so that its reading always gives directly the azimuth of the telescope roughly. It is much advantageous to have an observing platform wholly isolated from the tripod or the pier, so as not to disturb the level of the instrument during the observation of each star.

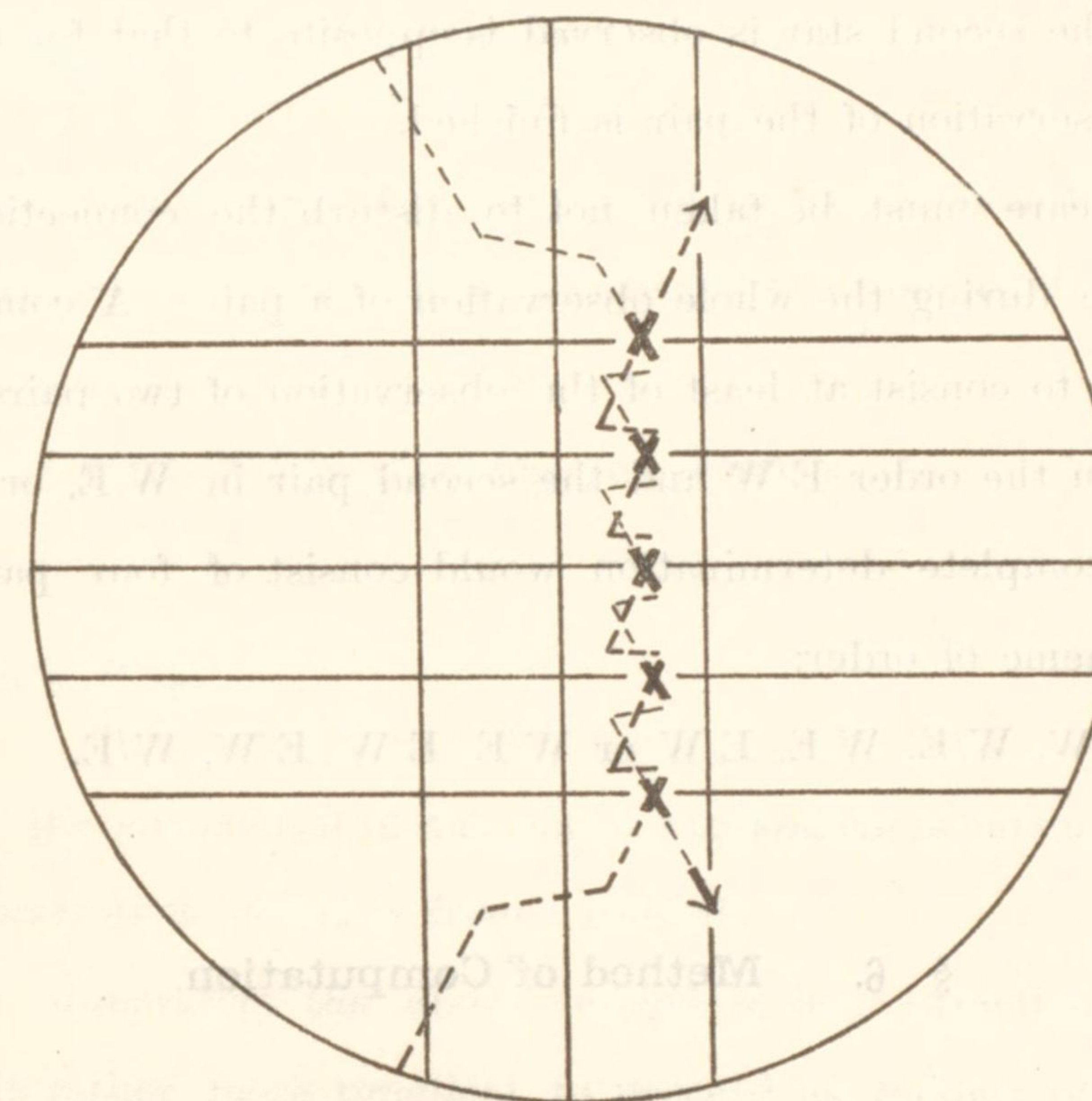
(c) A few minutes before the predicted time of observation of the first star, set the telescope at the zenith distance  $z$  or  $z'$  at which the pair is to be observed, and set the instrument at the azimuth  $A_E$  or  $A'_W$  at which the first star is to be observed. Clamp the level firmly to the telescope in such a position that its bubble swings about at the middle of its graduation.

(d) About two minutes before the predicted time of observation (*i. e.* the time at which the star would pass through the middle horizontal wire), the first star would begin to appear in the field. It would apparently move obliquely from one toward the opposite corner. When it approaches the first horizontal wire, carefully turn the instrument in azimuth by means of the fine-motion screw of the horizontal circle, and bring the star in such an estimated position that it would pass the first horizontal wire by the middle vertical wire or better by the middle of a prefixed pair of vertical wires. Read then the level and observe the chronometer time of the passage of the star over the first horizontal wire at a prefixed position relative to the vertical wires.

The star would continue its oblique motion. Turning the instrument in azimuth carefully by means of the fine-motion screw, determine the time of the star's passage over the second horizontal wire by the same vertical position, and

proceed likewise for all other successive horizontal wires. The times of the star's

Fig. 1



The dotted and broken lines denote the apparent paths of the two stars in the telescope field, during the observation.

The observations are made at the points shown by X.

transit may be observed by *eye and ear method* or more accurately by the use of a *chronograph*.

Lastly read the level. With this we finish the observation of the first star.

(e) Direct the telescope next to the azimuth  $A_W$  or  $A'_E$  of the second star, and look at the level. Adjust the level, when necessary, so as to assume nearly the same readings as by the observation of the first star. This adjustment must be made by the foot screws or a tangent screw the touch of which does not affect the connection of the level with the telescope at all. The second star in a mean while would begin to appear in the field. It would apparently move in altitude directly opposite to, but in azimuth in the same direction as, the first star.



Exactly the same procedures are then followed as before, *i. e.* read the level, determine the times of passage over the successive horizontal wires by the same vertical position as before, and lastly read the level. The order of the horizontal wires in which the second star is observed is opposite to that for the first star.

With this the observation of the pair is finished.

(f) Utmost care must be taken not to disturb the connection of the level and the telescope during the whole observation of a pair. A complete determination of time is to consist at least of the observation of two pairs, the first pair being observed in the order E/W and the second pair in W/E, or in the reverse order. A more complete determination would consist of four pairs observed in the following scheme of order:

E/W, W/E, W/E, E/W or W/E, E/W, E/W, W/E.

### § 6. Method of Computation.

#### (I) Correction of an Observed Time for Inclination.

In showing the fundamental conception of the method, in § 2, we have assumed that our instrument is perfectly leveled. This ideal case can not be realized generally. But it matters little if we reduce the observed times of one star for inclination of the telescope from the differences of the level readings at the observation of the two stars.

Let  $i_E$ ,  $i_W$  and  $o_E$ ,  $o_W$  be the readings of the two ends of the level bubble,  $i$  being that nearer to the eye-piece, and  $o$  that nearer to the objective of the telescope, and the suffixes  $E$  and  $W$  denoting that the notations partake to the east and the west stars respectively. When the level readings are made twice before and after the star's observation, we take for each of the above quantities the mean of the two corresponding readings thus taken. Again let  $\mu$  be the value of one division of the level graduation, expressed in *seconds of arc*.

After N. Zinger (See Prof. M. Kamensky's note, *The Bulletin of the Hydrographic Department, Volume III, p. 12*), the reduction for inclination, to be applied to the observed time of one star, is given by the expression:

$$\delta Ti = \pm \frac{(i_W - i_E) + (o_W - o_E)}{2 \times 15 \cos \varphi \sin a} \mu$$

$a$  being practically the mean of the azimuths of the two stars at their observations, reckoned from the south in the opposite directions. The above expression may be transformed into:

$$\delta Ti = \pm M \{(i_W - i_E) + (o_W - o_E)\} \operatorname{cosec} a$$

where

$$M = \frac{\mu}{30} \sec \varphi$$

The *plus* or the *minus* sign of the above expressions is taken according as the level reading *increases* or *decreases* from  $i$  towards  $o$ .

For a fixed observatory the above method is very expedient. But, for field work, we find it rather more practical to proceed as follows, after *Handbuch der Küstenvermessungen*.

The reduction in question is evidently proportional to the change of inclination of the telescope as indicated by the differences of the level readings. The factor of this proportionality may be considered to be practically equal to the proportion  $\tau/d$  in which  $\tau$  is the difference of the observed times of the star's transits over the two extreme wires whose vertical distance is  $d$ . From this consideration we have for the reduction the expression:

$$\delta Ti = \pm S \tau \{(i_W - i_E) + (o_W - o_E)\}$$

where

$$S = \frac{\mu}{2d}$$

$\tau$  and  $d$ , the quantities above defined, being here expressed in *seconds of time* and in *seconds of arc* respectively.  $S$  and  $\tau$  are always to be taken as positive.  $S$  may



be tabulated as the constants of the instrument for all the combinations of two wires. The *plus* or the *minus* sign of the above expression is to be taken, also in this case, according as the level reading *increases* or *decreases* from *i* towards *o*.

The above reduction may be applied to the observed times of either star. But it is preferable to apply it to those from which the value of  $\tau$  is derived.

(II) Deduction of the Chronometer Correction.

Denoting all the quantities referring to the east star with the suffix *E* and those referring to the west star with *W*, the equation (I) in § 2 may be written:

$$\sin \varphi (\sin \delta_E - \sin \delta_W) + \cos \varphi \{ \cos \delta_E \cos (T_E + \Delta T - \alpha_E) - \cos \delta_W \cos (T_W + \Delta T - \alpha_W) \} = 0$$

Here we take for  $T_E$  and  $T_W$  the means of all the observed times *already corrected for inclination*, of the east and the west stars respectively.

Putting:

$$t = \frac{1}{2} (\alpha_E - \alpha_W) - \frac{1}{2} (T_E - T_W)$$

$$r = \frac{1}{2} (\alpha_E + \alpha_W) - \frac{1}{2} (T_E + T_W) - \Delta T$$

or

$$t + r = \alpha_E - (T_E + \Delta T)$$

$$t - r = (T_W + \Delta T) - \alpha_W$$

and

$$\delta = \frac{1}{2} (\delta_E + \delta_W), \quad \varepsilon = \frac{1}{2} (\delta_E - \delta_W)$$

the above equation can easily be transformed into:

$$\sin \varphi \sin \varepsilon \cos \delta - \cos \varphi (\cos t \cos r \sin \delta \sin \varepsilon + \sin t \sin r \cos \delta \cos \varepsilon) = 0$$

or

$$\sin r + \frac{\tan \varepsilon \tan \delta}{\tan t} \cos r - \frac{\tan \varepsilon \tan \varphi}{\sin t} = 0$$

Putting:

$$\tan m = \frac{\tan \varepsilon \tan \delta}{\tan t}, \quad \sin n = \frac{\tan \varepsilon \tan \varphi}{\sin t} \cos m,$$

we have:

$$\sin r + \tan m \cos r - \frac{\sin n}{\cos m} = 0$$

or

$$\sin (r+m) = \sin n$$

Thus we have:

$$r = n - m$$

$$\Delta T = \frac{1}{2} (\alpha_E + \alpha_W) - \frac{1}{2} (T_E + T_W) - r$$

The above expressions are all quite rigorous. The quantity  $\varepsilon$  is however not large in all of the existing lists of star pairs, and  $m$  and  $n$  therefore are not large as can be seen from their definitions.

Now for a small angle  $X^s$  expressed in second of time, we have:

$$\log \sin X^s = \log X^s + \log \sin 1^s - \sigma (X^s)$$

$$\log \tan X^s = \log X^s + \log \sin 1^s + 2\sigma (X^s)$$

$$\log \cos X^s = -3\sigma (X^s)$$

where

$$\sigma (X^s) = \log \frac{X^s \sin 1^s}{\sin X^s}$$

But from the equations defining  $m$  and  $n$ , we have:

$$\log \tan m = \log \tan \varepsilon + \log \left( \frac{\tan \delta}{\tan t} \right),$$

$$\log \sin n = \log \tan \varepsilon + \log \cos m + \log \frac{\tan \varphi}{\sin t}$$

Treating  $\varepsilon$ ,  $m$  and  $n$ , as small quantities, and substituting for  $\log \tan m$ ,  $\log \tan \varepsilon$ ,  $\log \sin n$ , and  $\log \cos m$ , their equivalent expressions as above given, we have:

$$\log m^s = \{ \log \varepsilon^s + 2\sigma (\varepsilon) \} + \log (\tan \delta \cot t) - 2\sigma (m),$$



$$\log n^S = \{\log \varepsilon^S + 2\sigma(\varepsilon)\} + \log(\tan \varphi \operatorname{cosec} t) + \{\sigma(n) - 3\sigma(m)\}$$

Again the observed times must be corrected for the diurnal aberration by the quantity  $-0.021 \cos z$ . Thus we can now summarize the formulæ for the computation of the chronometer correction as follows:

$$\delta = \frac{1}{2}(\delta_E + \delta_W), \quad t = \frac{1}{2}(\alpha_E - \alpha_W) - \frac{1}{2}(T_E - T_W)$$

$$\varepsilon = \frac{1}{2}(\delta_E - \delta_W)$$

$$\log m_0^S = \log \varepsilon^S + 2\sigma(\varepsilon^S) + \log \tan \delta + \log \cot t$$

$$\log n_0^S = \log \varepsilon^S + 2\sigma(\varepsilon^S) + \log \tan \varphi + \log \operatorname{cosec} t$$

$$\log m^S = \log m_0^S - 2\sigma(m_0^S)$$

$$\log n^S = \log n_0^S + \sigma(n_0^S) - 3\sigma(m_0^S)$$

$$r^S = n^S - m^S$$

$$\Delta T = \frac{1}{2}(\alpha_E + \alpha_W) - \frac{1}{2}(T_E + T_W) + 0.021 \cos z - r^S$$

The value of  $\sigma(X^S)$  with  $\log X^S$  as argument is tabulated at Table III of this work. The value of  $0.021 \cos z$  is given with the zenith distance  $z$  as argument in the following table.

Correction for Diurnal Aberration.

| $z$            | $10^\circ$ | $20^\circ$ | $30^\circ$ | $40^\circ$ | $50^\circ$ | $60^\circ$ | $70^\circ$ |
|----------------|------------|------------|------------|------------|------------|------------|------------|
| $0.021 \cos z$ | 0.021      | 0.019      | 0.018      | 0.016      | 0.013      | 0.010      | 0.007      |

### § 7. The Preparative Table given in this Volume.

The table I of this volume is the catalogue of the stars, which are adopted as the star pairs in the table II, and contains the following quantities.

Column 1; The cardinal numbers of the stars, arranged in the order of Right Ascensions.

Column 2; Names of stars.

Column 3; Magnitudes of stars.

Column 4; Right Ascensions of stars for the epoch 1950.0.

Column 5; Declination of stars for the epoch 1950.0.

Column 6; Pairs to which the star pertains.

The table II contains the data required in observing the star pairs for every complete degree of the north latitudes  $0^\circ - 20^\circ$ .

The construction of the table is almost exactly same as those of Volume III, IV of this Bulletin. The pairs are arranged in the order of the sidereal time of the observation, and following quantities are given for each star pair.

Column 1  $\varphi$ ; The latitudes

Column 2  $S$ ; The sidereal time at which the two stars attain the equal altitudes simultaneously, viz. the first star is to be observed at  $S - 2^m.5$  and the second star at  $S + 2^m.5$ .

Column 3  $z$ ; The common zenith distance when the east star first and the west star next are to be observed.

Column 4, 5,  $A_E, A_W$ ; The azimuths of the east and the west stars, when the east star is to be observed first. The reckoning of Azimuth is from the south in the direction of  $S - W - N - E - S$ .

Column 6, 7, 8,  $d_z, dA_E, dA_W$ ; The reductions to be added algebraically to  $z, A_E$ , and  $A_W$ , when the west star first and east star next are to be observed.

Column 9, 10,  $\Delta z, \Delta A$ ; The correction of  $z, A_E$ , and  $A_W$  for the  $10'$  variation of the latitude.

The marginal table is the annual precessions of  $S, z, A_E$ , and  $A_W$ .

These corrections are very small and may be neglected till 1960 practically.

The table III is the value of  $\sigma(X^S)$ , which is necessary in the deduction of



the chronometer correction.

Lastly for the explanation of the use of the tables, we give an example of the calculation of the preparative data for the observation. The determination of time or longitude is to be made at Saipan ( $\varphi=15^\circ 12' N.$ ) at about the local sidereal time  $2^h 10^m$ . Looking in the table II we find the star pair No.21, is suit for the observation, and have following data.

$$\varphi=15^\circ 12' N.$$

|                            | S                                 | z       | A <sub>E</sub> | A <sub>W</sub> | Order of stars |
|----------------------------|-----------------------------------|---------|----------------|----------------|----------------|
| For $\varphi=15^\circ 0'$  | 2 <sup>h</sup> 12. <sup>m</sup> 4 | 46° 31' | 244° 39'       | 114° 18'       |                |
| Corr. for +12'             | 0.0                               | -5      | +10            | -10            |                |
| For $\varphi=15^\circ 12'$ | 2 12.4                            | 46 26   | 244 49         | 114 8          | E — W          |
| Red. for rev. of order     |                                   | -66     | -10            | +10            |                |
| For $\varphi=15^\circ 12'$ | 2 12.4                            | 45 20   | 244 39         | 114 18         | W — E          |

The preparative data.

| Pair No. | Star |      | T                               | E—W     |                |                | W—E     |                  |                  |
|----------|------|------|---------------------------------|---------|----------------|----------------|---------|------------------|------------------|
|          | No.  | Mag. |                                 | z       | A <sub>E</sub> | A <sub>W</sub> | z'      | A <sub>W</sub> ' | A <sub>E</sub> ' |
| 21       | 47   | 1.8  | 2 <sup>h</sup> 9 <sup>m</sup> 9 | 46° 26' | 244° 49'       | 114° 8'        | 45° 20' | 244° 39'         | 114° 18'         |
|          | 190  | 2.6  | 2 14.9                          |         |                |                |         |                  |                  |
| 22       | ...  | ...  | .....                           | .....   | .....          | .....          | .....   | .....            | .....            |
| 23       | ...  | ...  | .....                           | .....   | .....          | .....          | .....   | .....            | .....            |

For the example of record of observation and the computation of the chronometer correction, see page 22, Vol. IV of this Bulletin.



The following are the stars of the constellation Cetus which are included in the present catalogue.

| No. | Name of Star       | Mag.    | $\alpha$ 19 0.0 | $\delta$ 1950.0 | Pair        |
|-----|--------------------|---------|-----------------|-----------------|-------------|
| 1   | $\alpha$ Androm.   | 2.2     | h 5.8           | +28 49          | 35-37-173   |
| 2   | $\gamma$ Pegasi    | 2.9     | 10.7            | +14 54          | 171         |
| 3   | $\epsilon$ Ceti    | 3.8     | 16.9            | - 9 6           | 27-175      |
| 4   | $\delta$ Androm.   | 3.5     | 36.6            | +30 35          | 176         |
| 5   | $\beta$ Ceti       | 2.2     | o 41.1          | -18 16          | 30          |
| 6   | $\epsilon$ Piscium | 4.5     | 1 0.3           | + 7 37          | 40-46-47    |
| 7   | $\eta$ Ceti        | 3.6     | 6.1             | -10 27          | 33-172-178  |
| 8   | $\beta$ Androm.    | 2.4     | 6.9             | +35 21          | 49          |
| 9   | $\theta$ Ceti      | 3.8     | 21.5            | - 8 26          | 34-179      |
| 10  | $\eta$ Piscium     | 3.7     | 28.8            | +15 5           | 184-191     |
| 11  | $\tau$ Ceti        | 3.7     | 41.7            | -16 12          | 177         |
| 12  | $\zeta$ Ceti       | 3.9     | 49.0            | -10 35          | 36-181-194  |
| 13  | $\alpha$ Trianguli | 3.6     | 50.2            | +29 20          | 43-45-182   |
| 14  | $\xi$ Piscium      | 4.8     | 51.0            | + 2 57          | 180-188     |
| 15  | $\beta$ Arietis    | 2.7     | 51.9            | +20 34          | 42-185-190  |
| 16  | $\nu$ Ceti         | 4.2     | 1 57.6          | -21 19          | 183-187     |
| 17  | $\alpha$ Arietis   | 2.2     | 2 4.3           | +23 14          | 39-44       |
| 18  | $\beta$ Trianguli  | 3.1     | 6.6             | +34 45          | 52          |
| 19  | $\sigma$ Ceti      | 2.0-9.6 | 16.8            | - 3 12          | 50          |
| 20  | $\delta$ Ceti      | 4.0     | 36.9            | + 0 7           | 195         |
| 21  | $\gamma^2$ Ceti    | 3.7     | 40.7            | + 3 2           | 54          |
| 22  | $\pi$ Ceti         | 4.4     | 41.7            | -14 4           | 4-196       |
| 23  | $\mu$ Ceti         | 4.4     | 42.2            | + 9 54          | 6-51-60-193 |
| 24  | $\epsilon$ Arietis | 3.7     | 47.0            | +27 3           | 48-57-192   |
| 25  | $\eta$ Eridani     | 4.1     | 2 54.0          | - 9 6           | 199         |

TABLE I.

THE CATALOGUE OF THE 196 STARS  
FOR THE EPOCH 1950.0.

| No. | Name of Star       | Mag.    | $\alpha$ 19 0.0 | $\delta$ 1950.0 | Pair        |
|-----|--------------------|---------|-----------------|-----------------|-------------|
| 1   | $\alpha$ Androm.   | 2.2     | h<br>o 5.8      | +28 49          | 35-37-173   |
| 2   | $\gamma$ Pegasi    | 2.9     | 10.7            | +14 54          | 171         |
| 3   | $\epsilon$ Ceti    | 3.8     | 16.9            | - 9 6           | 27-175      |
| 4   | $\delta$ Androm.   | 3.5     | 36.6            | +30 35          | 176         |
| 5   | $\beta$ Ceti       | 2.2     | o 41.1          | -18 16          | 30          |
| 6   | $\epsilon$ Piscium | 4.5     | 1 0.3           | + 7 37          | 40-46-47    |
| 7   | $\eta$ Ceti        | 3.6     | 6.1             | -10 27          | 33-172-178  |
| 8   | $\beta$ Androm.    | 2.4     | 6.9             | +35 21          | 49          |
| 9   | $\theta$ Ceti      | 3.8     | 21.5            | - 8 26          | 34-179      |
| 10  | $\eta$ Piscium     | 3.7     | 28.8            | +15 5           | 184-191     |
| 11  | $\tau$ Ceti        | 3.7     | 41.7            | -16 12          | 177         |
| 12  | $\zeta$ Ceti       | 3.9     | 49.0            | -10 35          | 36-181-194  |
| 13  | $\alpha$ Trianguli | 3.6     | 50.2            | +29 20          | 43-45-182   |
| 14  | $\xi$ Piscium      | 4.8     | 51.0            | + 2 57          | 180-188     |
| 15  | $\beta$ Arietis    | 2.7     | 51.9            | +20 34          | 42-185-190  |
| 16  | $\nu$ Ceti         | 4.2     | 1 57.6          | -21 19          | 183-187     |
| 17  | $\alpha$ Arietis   | 2.2     | 2 4.3           | +23 14          | 39-44       |
| 18  | $\beta$ Trianguli  | 3.1     | 6.6             | +34 45          | 52          |
| 19  | $\sigma$ Ceti      | 2.0-9.6 | 16.8            | - 3 12          | 50          |
| 20  | $\delta$ Ceti      | 4.0     | 36.9            | + 0 7           | 195         |
| 21  | $\gamma^2$ Ceti    | 3.7     | 40.7            | + 3 2           | 54          |
| 22  | $\pi$ Ceti         | 4.4     | 41.7            | -14 4           | 4-196       |
| 23  | $\mu$ Ceti         | 4.4     | 42.2            | + 9 54          | 6-51-60-193 |
| 24  | $\epsilon$ Arietis | 3.7     | 47.0            | +27 3           | 48-57-192   |
| 25  | $\eta$ Eridani     | 4.1     | 2 54.0          | - 9 6           | 199         |



TABLE I.

| No. | Name of Star           | Mag.    | α 1950.0 |      | δ 1950.0 |    | Pair            |
|-----|------------------------|---------|----------|------|----------|----|-----------------|
|     |                        |         | h        | m    | °        | '  |                 |
| 26  | α Ceti                 | 2.8     | 2        | 59.7 | + 3      | 54 | 9-55-186        |
| 27  | ο Tauri                | 3.8     | 3        | 22.1 | + 8      | 51 | 5-63-69-189     |
| 28  | ξ Tauri                | 3.8     |          | 24.5 | + 9      | 34 | 8-53-59-197-198 |
| 29  | 5 Tauri                | 4.3     |          | 28.1 | +12      | 46 | 13-56-62        |
| 30  | ε Eridani              | 3.8     |          | 30.6 | - 9      | 38 | 2               |
| 31  | δ Eridani              | 3.7     |          | 40.9 | - 9      | 56 | 3               |
| 32  | η Tauri                | 3.0     |          | 44.5 | +23      | 57 | 61              |
| 33  | γ Eridani              | 3.2     |          | 55.7 | -13      | 39 | 68              |
| 34  | ξ Persei               | 4.1     |          | 55.7 | +35      | 39 | 67              |
| 35  | λ Tauri                | 3.8-4.2 | 3        | 57.9 | +12      | 21 | 58-64-75        |
| 36  | ν Tauri                | 3.9     | 4        | 0.5  | + 5      | 51 | 200             |
| 37  | ο <sup>1</sup> Eridani | 4.1     |          | 9.4  | - 6      | 58 | 7               |
| 38  | γ Tauri                | 3.9     |          | 16.9 | +15      | 31 | 15-71           |
| 39  | δ Tauri                | 3.9     |          | 20.0 | +17      | 26 | 1-65            |
| 40  | α Tauri                | 1.1     | 4        | 33.0 | +16      | 25 | 66-70           |
| 41  | ε Leporis              | 3.3     | 5        | 3.3  | -22      | 26 | 72              |
| 42  | β Eridani              | 2.9     |          | 5.4  | - 5      | 9  | 10              |
| 43  | μ Leporis              | 3.3     |          | 10.7 | -16      | 16 | 12-77           |
| 44  | β Orionis              | 0.3     |          | 12.1 | - 8      | 15 | 27              |
| 45  | τ Orionis              | 3.7     |          | 15.2 | - 6      | 54 | 11              |
| 46  | γ Orionis              | 1.7     |          | 22.4 | + 6      | 18 | 16-26           |
| 47  | β Tauri                | 1.8     |          | 23.1 | +28      | 34 | 21              |
| 48  | β Leporis              | 3.0     |          | 26.1 | -20      | 48 | 22              |
| 49  | δ Orionis              | 2.5     |          | 29.5 | - 0      | 20 | 19-79-82        |
| 50  | α Leporis              | 2.7     |          | 30.5 | -17      | 51 | 30              |
| 51  | ι Orionis              | 2.9     |          | 33.0 | - 5      | 56 | 14-85           |
| 52  | ε Orionis              | 1.8     |          | 33.7 | - 1      | 14 | 17-18-20-78-83  |
| 53  | ζ Tauri                | 3.0     |          | 34.7 | +21      | 7  | 74              |
| 54  | ζ Leporis              | 3.7     |          | 44.7 | -14      | 50 | 73              |
| 55  | κ Orionis              | 2.2     | 5        | 45.4 | - 9      | 41 | 33-34-36        |

| No. | Name of Star   | Mag.    | α 1950.0 |      | δ 1950.0 |    | Pair               |
|-----|----------------|---------|----------|------|----------|----|--------------------|
|     |                |         | h        | m    | °        | '  |                    |
| 56  | α Orionis      | 0.5-1.1 | 5        | 52.5 | + 7      | 24 | 28                 |
| 57  | η Leporis      | 3.8     | 5        | 54.1 | -14      | 11 | 76                 |
| 58  | η Geminor.     | 3.3-4.2 | 6        | 11.9 | +22      | 31 | 24-39              |
| 59  | μ Geminor.     | 3.2     |          | 19.9 | +22      | 32 | 25                 |
| 60  | β Canis Maj.   | 2.0     |          | 20.5 | -17      | 56 | 81                 |
| 61  | γ Geminor.     | 1.9     |          | 34.8 | +16      | 27 | 95                 |
| 62  | ε Geminor.     | 3.2     |          | 40.9 | +25      | 11 | 23                 |
| 63  | 18 Monocerotis | 4.7     |          | 45.3 | + 2      | 28 | 88-92              |
| 64  | θ Geminor.     | 3.6     | 6        | 49.5 | +34      | 1  | 94                 |
| 65  | ζ Geminor.     | 3.7-4.1 | 7        | 1.1  | +20      | 39 | 42-91              |
| 66  | δ Canis maj.   | 2.0     |          | 6.4  | -26      | 19 | 90                 |
| 67  | λ Geminor.     | 3.7     |          | 15.2 | +16      | 38 | 80-89-98           |
| 68  | δ Geminor.     | 3.5     |          | 17.1 | +22      | 5  | 29-44-102          |
| 69  | ι Geminor.     | 3.9     |          | 22.6 | +27      | 54 | 31-35-43-48        |
| 70  | β Canis Min.   | 3.1     |          | 24.4 | + 8      | 24 | 40-84              |
| 71  | α Canis Min.   | 0.5     |          | 36.7 | + 5      | 21 | 100                |
| 72  | β Geminor.     | 1.2     | 7        | 42.3 | +28      | 9  | 32-37-45-97-99-101 |
| 73  | β Cancri       | 3.8     | 8        | 13.8 | + 9      | 20 | 51-53-86-108       |
| 74  | Bradley 1197   | 4.0     |          | 23.2 | - 3      | 45 | 50-104             |
| 75  | δ Hydræ        | 4.2     |          | 35.0 | + 5      | 53 | 38-87              |
| 76  | δ Cancri       | 4.2     |          | 41.8 | +18      | 20 | 96-107             |
| 77  | ε Hydræ        | 3.5     |          | 44.1 | + 6      | 36 | 41-46-105          |
| 78  | ζ Hydræ        | 3.3     |          | 52.8 | + 6      | 8  | 47                 |
| 79  | α Cancri       | 4.3     | 8        | 55.8 | +12      | 3  | 56-58-93-112       |
| 80  | θ Hydræ        | 3.8     | 9        | 11.8 | + 2      | 32 | 54-55-103-110-114  |
| 81  | α Lynceis      | 3.3     |          | 18.0 | +34      | 36 | 49-52              |
| 82  | α Hydræ        | 2.2     |          | 25.1 | - 8      | 26 | 106                |
| 83  | ο Leonis       | 3.8     |          | 38.5 | +10      | 7  | 59-113             |
| 84  | ε Leonis       | 3.1     |          | 43.0 | +24      | 0  | 61                 |
| 85  | μ Leonis       | 4.1     | 9        | 49.9 | +26      | 15 | 57-109             |



| No. | Name of Star        | Mag. | $\alpha$ 1950.0 |      | $\delta$ 1950.0 |    | Pair             |
|-----|---------------------|------|-----------------|------|-----------------|----|------------------|
|     |                     |      | h               | m    | $^{\circ}$      | '  |                  |
| 86  | $\eta$ Leonis       | 3.6  | 10              | 4.6  | +17             | 0  | 65-66            |
| 87  | $\alpha$ Leonis     | 1.3  |                 | 5.7  | +12             | 13 | 62-64-117        |
| 88  | $\mu$ Hydrae        | 4.1  |                 | 23.7 | -16             | 35 | 118              |
| 89  | $\rho$ Leonis       | 3.9  |                 | 30.2 | +9              | 34 | 60-63-116-121    |
| 90  | $\nu$ Hydrae        | 3.3  |                 | 47.2 | -15             | 56 | 73-120           |
| 91  | 46 Leon. Min.       | 3.9  | 10              | 50.5 | +34             | 29 | 67               |
| 92  | $\beta$ Crateris    | 4.5  | 11              | 9.2  | -22             | 33 | 72               |
| 93  | $\delta$ Leonis     | 2.6  |                 | 11.5 | +20             | 48 | 74-124-126       |
| 94  | $\theta$ Leonis     | 3.4  |                 | 11.6 | +15             | 42 | 70-80-115        |
| 95  | $\nu$ Ursae Maj.    | 3.7  |                 | 15.8 | +33             | 22 | 128              |
| 96  | $\delta$ Crateris   | 3.8  |                 | 16.8 | -14             | 30 | 68-76-122        |
| 97  | $\tau$ Leonis       | 5.2  |                 | 25.4 | +3              | 8  | 111              |
| 98  | $\beta$ Leonis      | 2.2  |                 | 46.5 | +14             | 51 | 71-123           |
| 99  | $\beta$ Virginis    | 3.8  |                 | 48.1 | +2              | 3  | 119-125-131      |
| 100 | $\pi$ Virginis      | 4.6  | 11              | 58.3 | +6              | 54 | 87               |
| 101 | $\nu$ Virginis      | 4.2  | 12              | 2.7  | +9              | 1  | 69-84-86-127-133 |
| 102 | $\gamma$ Corvi      | 2.8  |                 | 13.2 | -17             | 16 | 81               |
| 103 | $\eta$ Virginis     | 4.0  |                 | 17.3 | -0              | 23 | 78-134-135       |
| 104 | $\delta$ Corvi      | 3.1  |                 | 27.3 | -16             | 14 | 77               |
| 105 | $\gamma$ Virginis   | 2.9  |                 | 39.1 | -1              | 11 | 79               |
| 106 | $\delta$ Virginis   | 3.7  |                 | 53.1 | +3              | 40 | 129-130          |
| 107 | $\epsilon$ Virginis | 3.0  | 12              | 59.7 | +11             | 14 | 75-93-136-139    |
| 108 | $\gamma$ Hydrae     | 3.3  | 13              | 16.2 | -22             | 55 | 143              |
| 109 | $\alpha$ Virginis   | 1.2  |                 | 22.6 | -10             | 54 | 132              |
| 110 | $\zeta$ Virginis    | 3.4  |                 | 32.1 | -0              | 20 | 82-83-140-146    |
| 111 | $\tau$ Bootis       | 4.5  |                 | 44.9 | +17             | 42 | 89               |
| 112 | $\eta$ Bootis       | 2.8  |                 | 52.3 | +18             | 39 | 96-141           |
| 113 | $\tau$ Virginis     | 4.3  | 13              | 59.1 | +1              | 47 | 88               |
| 114 | $\pi$ Hydrae        | 3.5  | 14              | 3.5  | -26             | 27 | 90               |
| 115 | $\alpha$ Bootis     | 0.2  | 14              | 13.4 | +19             | 27 | 91-137-142       |

| No. | Name of Star           | Mag.    | $\alpha$ 1950.0 |      | $\delta$ 1950.0 |    | Pair            |
|-----|------------------------|---------|-----------------|------|-----------------|----|-----------------|
|     |                        |         | h               | m    | $^{\circ}$      | '  |                 |
| 116 | $\epsilon$ Virginis    | 4.2     | 14              | 13.4 | -5              | 46 | 85-138-147      |
| 117 | $\rho$ Bootis          | 3.8     |                 | 29.7 | +30             | 35 | 153             |
| 118 | $\mu$ Virginis         | 4.0     |                 | 40.4 | -5              | 27 | 149             |
| 119 | 109 Virginis           | 3.8     |                 | 43.7 | +2              | 6  | 92-103-111      |
| 120 | $\alpha^2$ Librae      | 2.9     | 14              | 48.1 | -15             | 50 | 144-155         |
| 121 | $\psi$ Bootis          | 4.7     | 15              | 2.3  | +27             | 9  | 97              |
| 122 | $\delta$ Bootis        | 3.5     |                 | 13.5 | +33             | 30 | 94              |
| 123 | $\beta$ Librae         | 2.7     |                 | 14.3 | -9              | 12 | 106-148         |
| 124 | $\beta$ Coron. Bor.    | 3.7     |                 | 25.8 | +29             | 17 | 99-157          |
| 125 | $\alpha$ Coron. Bor.   | 2.3     |                 | 32.6 | +26             | 53 | 109-158         |
| 126 | $\alpha$ Serpentis     | 2.8     |                 | 41.8 | +6              | 35 | 105-156         |
| 127 | $\beta$ Serpentis      | 3.7     |                 | 43.9 | +15             | 35 | 95-98-150-159   |
| 128 | $\kappa$ Serpentis     | 4.3     |                 | 46.5 | +18             | 18 | 145             |
| 129 | $\mu$ Serpentis        | 3.6     |                 | 47.0 | -3              | 17 | 104             |
| 130 | $\epsilon$ Serpentis   | 3.8     |                 | 48.3 | +4              | 38 | 100-152         |
| 131 | $\gamma$ Serpentis     | 3.9     |                 | 54.1 | +15             | 49 | 115-151         |
| 132 | $\epsilon$ Coron. Bor. | 4.2     |                 | 55.5 | +27             | 1  | 101-160         |
| 133 | $\delta$ Scorpii       | 2.5     | 15              | 57.4 | -22             | 29 | 161             |
| 134 | $\gamma$ Herculis      | 3.8     | 16              | 19.7 | +19             | 16 | 107             |
| 135 | $\beta$ Herculis       | 2.8     |                 | 28.1 | +21             | 36 | 102             |
| 136 | $\lambda$ Ophiuchi     | 3.9     |                 | 28.4 | +2              | 6  | 110-119         |
| 137 | $\zeta$ Ophiuchi       | 2.7     |                 | 34.4 | -10             | 28 | 154-172         |
| 138 | $\kappa$ Ophiuchi      | 3.4     | 16              | 55.3 | +9              | 27 | 108-113-116-163 |
| 139 | $\eta$ Ophiuchi        | 2.6     | 17              | 7.5  | -15             | 40 | 165-177         |
| 140 | $\alpha^1$ Herculis    | 3.1-3.9 |                 | 12.4 | +14             | 27 | 123-166-171     |
| 141 | $\delta$ Herculis      | 3.2     |                 | 13.0 | +24             | 54 | 162             |
| 142 | $\alpha$ Ophiuchi      | 2.1     |                 | 32.6 | +12             | 36 | 112-117         |
| 143 | $\xi$ Serpentis        | 3.6     |                 | 34.7 | -15             | 22 | 118-120-122-167 |
| 144 | $\beta$ Ophiuchi       | 2.9     |                 | 41.0 | +4              | 35 | 129-164         |
| 145 | $\mu$ Herculis         | 3.5     | 17              | 44.5 | +27             | 45 | 173             |



| No. | Name of Star        | Mag.    | $\alpha$ 1950.0 |      | $\delta$ 1950.0 |    | Pair                |
|-----|---------------------|---------|-----------------|------|-----------------|----|---------------------|
|     |                     |         | h               | m    | $^{\circ}$      | '  |                     |
| 146 | $\gamma$ Ophiuchi   | 3.7     | 17              | 45.4 | + 2             | 43 | 114-169-180         |
| 147 | $\xi$ Herculis      | 3.8     |                 | 55.8 | +29             | 15 | 176                 |
| 148 | $\nu$ Ophiuchi      | 3.5     |                 | 56.3 | - 9             | 46 | 132-175-178-179-181 |
| 149 | 67 Ophiuchi         | 4.0     | 17              | 58.1 | + 2             | 56 | 125-130-170-186     |
| 150 | 72 Ophiuchi         | 3.7     | 18              | 5.0  | + 9             | 33 | 121-127-189         |
| 151 | $\circ$ Herculis    | 3.8     |                 | 5.6  | +28             | 45 | 182                 |
| 152 | $\mu$ Sagittarii    | 4.0     |                 | 10.8 | -21             | 4  | 183                 |
| 153 | $\eta$ Serpentis    | 3.4     |                 | 18.7 | - 2             | 55 | 168                 |
| 154 | 109 Herculis        | 3.9     |                 | 21.6 | +21             | 45 | 124                 |
| 155 | 110 Herculis        | 4.3     |                 | 43.5 | +20             | 30 | 126-137-185         |
| 156 | $\gamma$ Lyrae      | 3.3     |                 | 57.1 | +32             | 37 | 128                 |
| 157 | $\epsilon$ Aquilae  | 4.2     | 18              | 57.4 | +15             | 0  | 184                 |
| 158 | $\zeta$ Aquilae     | 3.0     | 19              | 3.1  | +13             | 47 | 174                 |
| 159 | $\lambda$ Aquilae   | 3.6     |                 | 3.6  | - 4             | 58 | 138                 |
| 160 | $\pi$ Sagittarii    | 3.0     |                 | 6.8  | -21             | 6  | 187                 |
| 161 | $\delta$ Aquilae    | 3.4     |                 | 23.0 | + 3             | 1  | 131-188             |
| 162 | $\beta^1$ Cygni     | 3.2     |                 | 28.7 | +27             | 51 | 192                 |
| 163 | $\gamma$ Aquilae    | 2.8     |                 | 43.9 | +10             | 29 | 133-136-193-197     |
| 164 | $\delta$ Sagittae   | 3.8     |                 | 45.2 | +18             | 25 | 1-145               |
| 165 | $\alpha$ Aquilae    | 0.9     |                 | 48.3 | + 8             | 44 | 198                 |
| 166 | $\eta$ Aquilae      | 3.7-4.3 |                 | 49.9 | + 0             | 53 | 134                 |
| 167 | $\beta$ Aquilae     | 3.9     |                 | 52.9 | + 6             | 17 | 200                 |
| 168 | $\gamma$ Sagittae   | 3.7     | 19              | 56.5 | +19             | 21 | 141-142-190         |
| 169 | $\theta$ Aquilae    | 3.4     | 20              | 8.7  | - 0             | 58 | 135-140-195         |
| 170 | $\beta$ Capric.     | 3.3     |                 | 18.2 | -14             | 56 | 144-196             |
| 171 | $\epsilon$ Delphini | 4.0     |                 | 30.8 | +11             | 8  | 139                 |
| 172 | $\beta$ Delphini    | 3.7     |                 | 35.2 | +14             | 25 | 191                 |
| 173 | $\alpha$ Delphini   | 3.9     |                 | 37.3 | +15             | 44 | 150-151             |
| 174 | $\epsilon$ Aquarii  | 3.8     | 20              | 45.0 | - 9             | 41 | 2-3-148-154-194-199 |
| 175 | $\alpha$ Equulei    | 4.1     | 21              | 13.3 | + 5             | 2  | 152                 |

| No. | Name of Star      | Mag. | $\alpha$ 1950.0 |      | $\delta$ 1950.0 |    | Pair               |
|-----|-------------------|------|-----------------|------|-----------------|----|--------------------|
|     |                   |      | h               | m    | $^{\circ}$      | '  |                    |
| 176 | $\zeta$ Capric.   | 3.9  | 21              | 23.8 | -22             | 38 | 143                |
| 177 | $\beta$ Aquarii   | 3.1  |                 | 28.9 | - 5             | 48 | 7-10-11-14-147-149 |
| 178 | $\gamma$ Capric.  | 3.8  |                 | 37.3 | -16             | 53 | 12                 |
| 179 | $\epsilon$ Pegasi | 2.5  | 21              | 41.7 | + 9             | 39 | 5                  |
| 180 | $\alpha$ Aquarii  | 3.2  | 22              | 3.2  | - 0             | 34 | 17-146             |
| 181 | $\iota$ Aquarii   | 4.4  |                 | 3.7  | -14             | 7  | 4                  |
| 182 | $\iota$ Pegasi    | 4.0  |                 | 4.7  | +25             | 6  | 23-162             |
| 183 | $\theta$ Pegasi   | 3.7  |                 | 7.7  | + 5             | 57 | 16-156-164         |
| 184 | $\gamma$ Aquarii  | 4.0  |                 | 19.1 | - 1             | 38 | 18-168             |
| 185 | $\eta$ Aquarii    | 4.1  |                 | 32.8 | - 0             | 23 | 19-20              |
| 186 | $\zeta$ Pegasi    | 3.6  |                 | 39.0 | +10             | 34 | 6-8-163            |
| 187 | $\eta$ Pegasi     | 3.1  |                 | 40.7 | +29             | 58 | 153-157            |
| 188 | $\lambda$ Pegasi  | 4.1  |                 | 44.1 | +23             | 18 | 24-25-29           |
| 189 | $\delta$ Aquarii  | 3.5  | 22              | 52.0 | -16             | 5  | 155-165-167        |
| 190 | $\beta$ Pegasi    | 2.6  | 23              | 1.3  | +27             | 49 | 21-31-32-158-160   |
| 191 | $\alpha$ Pegasi   | 2.6  |                 | 2.3  | +14             | 56 | 15-159-166-174     |
| 192 | 88 Aquarii        | 3.8  |                 | 6.8  | -21             | 27 | 22-161             |
| 193 | $\gamma$ Piscium  | 3.9  |                 | 14.6 | + 3             | 1  | 9-169-170          |
| 194 | $\theta$ Piscium  | 4.5  |                 | 25.4 | + 6             | 6  | 38                 |
| 195 | 70 Pegasi         | 4.7  |                 | 26.6 | +12             | 29 | 13                 |
| 196 | $\omega$ Piscium  | 4.0  | 23              | 56.7 | + 6             | 35 | 26-28   41         |



| Latitude | Longitude | Time | ... |
|----------|-----------|------|-----|
| 100      | 0         | 0    | ... |
| 100      | 10        | 0    | ... |
| 100      | 20        | 0    | ... |
| 100      | 30        | 0    | ... |
| 100      | 40        | 0    | ... |
| 100      | 50        | 0    | ... |
| 100      | 0         | 10   | ... |
| 100      | 10        | 10   | ... |
| 100      | 20        | 10   | ... |
| 100      | 30        | 10   | ... |
| 100      | 40        | 10   | ... |
| 100      | 50        | 10   | ... |
| 100      | 0         | 20   | ... |
| 100      | 10        | 20   | ... |
| 100      | 20        | 20   | ... |
| 100      | 30        | 20   | ... |
| 100      | 40        | 20   | ... |
| 100      | 50        | 20   | ... |
| 100      | 0         | 30   | ... |
| 100      | 10        | 30   | ... |
| 100      | 20        | 30   | ... |
| 100      | 30        | 30   | ... |
| 100      | 40        | 30   | ... |
| 100      | 50        | 30   | ... |
| 100      | 0         | 40   | ... |
| 100      | 10        | 40   | ... |
| 100      | 20        | 40   | ... |
| 100      | 30        | 40   | ... |
| 100      | 40        | 40   | ... |
| 100      | 50        | 40   | ... |
| 100      | 0         | 50   | ... |
| 100      | 10        | 50   | ... |
| 100      | 20        | 50   | ... |
| 100      | 30        | 50   | ... |
| 100      | 40        | 50   | ... |
| 100      | 50        | 50   | ... |

TABLE II.

TABLE OF DATA REQUIRED IN OBSERVING THE 200 PAIRS FOR EVERY COMPLETE DEGREE OF THE NORTH LATITUDES 0°-20° AND FOR THE EPOCH 1950.0.

| Latitude | Longitude | Time | ... |
|----------|-----------|------|-----|
| 0        | 0         | 0    | ... |
| 0        | 10        | 0    | ... |
| 0        | 20        | 0    | ... |
| 0        | 30        | 0    | ... |
| 0        | 40        | 0    | ... |
| 0        | 50        | 0    | ... |
| 0        | 0         | 10   | ... |
| 0        | 10        | 10   | ... |
| 0        | 20        | 10   | ... |
| 0        | 30        | 10   | ... |
| 0        | 40        | 10   | ... |
| 0        | 50        | 10   | ... |
| 0        | 0         | 20   | ... |
| 0        | 10        | 20   | ... |
| 0        | 20        | 20   | ... |
| 0        | 30        | 20   | ... |
| 0        | 40        | 20   | ... |
| 0        | 50        | 20   | ... |
| 0        | 0         | 30   | ... |
| 0        | 10        | 30   | ... |
| 0        | 20        | 30   | ... |
| 0        | 30        | 30   | ... |
| 0        | 40        | 30   | ... |
| 0        | 50        | 30   | ... |
| 0        | 0         | 40   | ... |
| 0        | 10        | 40   | ... |
| 0        | 20        | 40   | ... |
| 0        | 30        | 40   | ... |
| 0        | 40        | 40   | ... |
| 0        | 50        | 40   | ... |
| 0        | 0         | 50   | ... |
| 0        | 10        | 50   | ... |
| 0        | 20        | 50   | ... |
| 0        | 30        | 50   | ... |
| 0        | 40        | 50   | ... |
| 0        | 50        | 50   | ... |

Annual Precessions of  $\delta$ ,  $\alpha$ , and  $\lambda$ .

| Latitude | Longitude | Time | ... |
|----------|-----------|------|-----|
| 0        | 0         | 0    | ... |
| 0        | 10        | 0    | ... |
| 0        | 20        | 0    | ... |
| 0        | 30        | 0    | ... |
| 0        | 40        | 0    | ... |
| 0        | 50        | 0    | ... |
| 0        | 0         | 10   | ... |
| 0        | 10        | 10   | ... |
| 0        | 20        | 10   | ... |
| 0        | 30        | 10   | ... |
| 0        | 40        | 10   | ... |
| 0        | 50        | 10   | ... |
| 0        | 0         | 20   | ... |
| 0        | 10        | 20   | ... |
| 0        | 20        | 20   | ... |
| 0        | 30        | 20   | ... |
| 0        | 40        | 20   | ... |
| 0        | 50        | 20   | ... |
| 0        | 0         | 30   | ... |
| 0        | 10        | 30   | ... |
| 0        | 20        | 30   | ... |
| 0        | 30        | 30   | ... |
| 0        | 40        | 30   | ... |
| 0        | 50        | 30   | ... |
| 0        | 0         | 40   | ... |
| 0        | 10        | 40   | ... |
| 0        | 20        | 40   | ... |
| 0        | 30        | 40   | ... |
| 0        | 40        | 40   | ... |
| 0        | 50        | 40   | ... |
| 0        | 0         | 50   | ... |
| 0        | 10        | 50   | ... |
| 0        | 20        | 50   | ... |
| 0        | 30        | 50   | ... |
| 0        | 40        | 50   | ... |
| 0        | 50        | 50   | ... |



TABLE II.

| Pair No. 1 | E | No. | Star              | Mag. | $\alpha_{1950}$ |      | $\delta_{1950}$ |    |
|------------|---|-----|-------------------|------|-----------------|------|-----------------|----|
|            |   |     |                   |      | h               | m    | °               | '  |
|            |   | 39  | $\delta$ Tauri    | 3.9  | 4               | 20.0 | +17             | 26 |
|            | W | 164 | $\delta$ Sagittae | 3.8  | 19              | 45.2 | +18             | 25 |

| $\varphi$ | S   |    | z  |     | $A_E$ |     | $A_W$ |     | dz | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi=+10'$ |            |   |
|-----------|-----|----|----|-----|-------|-----|-------|-----|----|--------|--------|-------------------------------|------------|---|
|           | h   | m  | °  | '   | °     | '   | °     | '   |    |        |        | $\Delta z$                    | $\Delta A$ |   |
|           | o   |    |    |     |       |     |       |     |    |        |        |                               | E          | W |
| +0        | 2.3 | 66 | 17 | 250 | 55    | 110 | 11    | -71 | -  | 11     | +      | -3.4                          | +4.1       | - |
| 1         | 2.3 | 65 | 57 | 251 | 20    | 109 | 46    | -71 | -  | 10     | +      | -3.3                          | +4.2       | - |
| 2         | 2.4 | 65 | 37 | 251 | 45    | 109 | 20    | -71 | -  | 9      | +      | -3.2                          | +4.3       | - |
| 3         | 2.4 | 65 | 18 | 252 | 11    | 108 | 54    | -71 | -  | 7      | +      | -3.1                          | +4.4       | - |
| 4         | 2.4 | 64 | 59 | 252 | 38    | 108 | 28    | -71 | -  | 6      | +      | -3.1                          | +4.4       | - |
| 5         | 2.5 | 64 | 41 | 253 | 5     | 108 | 1     | -71 | -  | 4      | +      | -3.0                          | +4.5       | - |
| 6         | 2.5 | 64 | 23 | 253 | 32    | 107 | 34    | -71 | -  | 3      | +      | -2.9                          | +4.6       | - |
| 7         | 2.6 | 64 | 6  | 254 | 0     | 107 | 6     | -71 | -  | 2      | +      | -2.9                          | +4.7       | - |
| 8         | 2.6 | 63 | 49 | 254 | 28    | 106 | 38    | -71 | -  | 0      | +      | -2.8                          | +4.7       | - |
| 9         | 2.6 | 63 | 33 | 254 | 57    | 106 | 10    | -71 | +  | 2      | -      | -2.7                          | +4.8       | - |
| 10        | 2.7 | 63 | 17 | 255 | 26    | 105 | 41    | -71 | +  | 3      | -      | -2.6                          | +4.9       | - |
| 11        | 2.7 | 63 | 1  | 255 | 55    | 105 | 12    | -71 | +  | 5      | -      | -2.5                          | +4.9       | - |
| 12        | 2.8 | 62 | 46 | 256 | 25    | 104 | 42    | -71 | +  | 6      | -      | -2.4                          | +5.0       | - |
| 13        | 2.8 | 62 | 32 | 256 | 55    | 104 | 12    | -71 | +  | 8      | -      | -2.4                          | +5.1       | - |
| 14        | 2.8 | 62 | 18 | 257 | 26    | 103 | 42    | -71 | +  | 9      | -      | -2.3                          | +5.1       | - |
| 15        | 2.9 | 62 | 5  | 257 | 57    | 103 | 11    | -71 | +  | 11     | -      | -2.2                          | +5.2       | - |
| 16        | 2.9 | 61 | 52 | 258 | 28    | 102 | 40    | -70 | +  | 12     | -      | -2.1                          | +5.3       | - |
| 17        | 3.0 | 61 | 40 | 259 | 0     | 102 | 9     | -70 | +  | 14     | -      | -2.0                          | +5.3       | - |
| 18        | 3.0 | 61 | 28 | 259 | 32    | 101 | 37    | -70 | +  | 16     | -      | -1.9                          | +5.4       | - |
| 19        | 3.0 | 61 | 17 | 260 | 4     | 101 | 5     | -70 | +  | 17     | -      | -1.8                          | +5.4       | - |
| +20       | 3.1 | 61 | 6  | 260 | 37    | 100 | 33    | -69 | +  | 19     | -      | -1.7                          | +5.5       | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| +0        | +0.05      | +0.1       | -0.1         | +0.1         |
| 5         | 0.05       | 0.1        | 0.2          | 0.2          |
| 10        | 0.05       | 0.1        | 0.2          | 0.2          |
| 15        | 0.05       | 0.1        | 0.2          | 0.2          |
| +20       | +0.05      | +0.1       | -0.2         | +0.2         |

| Pair No. 2 | E | No. | Star               | Mag. | $\alpha_{1950}$ |      | $\delta_{1950}$ |    |
|------------|---|-----|--------------------|------|-----------------|------|-----------------|----|
|            |   |     |                    |      | h               | m    | °               | '  |
|            |   | 30  | $\epsilon$ Eridani | 3.8  | 3               | 30.6 | -9              | 38 |
|            | W | 174 | $\epsilon$ Aquarii | 3.8  | 20              | 45.0 | -9              | 41 |

| $\varphi$ | S   |    | z  |     | $A_E$ |    | $A_W$ |     | dz | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi=+10'$ |            |   |
|-----------|-----|----|----|-----|-------|----|-------|-----|----|--------|--------|-------------------------------|------------|---|
|           | h   | m  | °  | '   | °     | '  | °     | '   |    |        |        | $\Delta z$                    | $\Delta A$ |   |
|           | o   |    |    |     |       |    |       |     |    |        |        |                               | E          | W |
| +0        | 7.8 | 51 | 58 | 282 | 15    | 77 | 41    | -73 | +  | 13     | -      | +2.1                          | +7.6       | - |
| 1         | 7.8 | 52 | 12 | 283 | 1     | 76 | 55    | -73 | +  | 15     | -      | +2.3                          | +7.6       | - |
| 2         | 7.8 | 52 | 25 | 283 | 46    | 76 | 10    | -73 | +  | 17     | -      | +2.4                          | +7.5       | - |
| 3         | 7.7 | 52 | 40 | 284 | 30    | 75 | 25    | -73 | +  | 19     | -      | +2.5                          | +7.4       | - |
| 4         | 7.7 | 52 | 56 | 285 | 14    | 74 | 41    | -72 | +  | 21     | -      | +2.6                          | +7.3       | - |
| 5         | 7.7 | 53 | 12 | 285 | 58    | 73 | 58    | -72 | +  | 23     | -      | +2.8                          | +7.2       | - |
| 6         | 7.7 | 53 | 29 | 286 | 41    | 73 | 15    | -71 | +  | 24     | -      | +2.9                          | +7.1       | - |
| 7         | 7.7 | 53 | 46 | 287 | 23    | 72 | 33    | -71 | +  | 26     | -      | +3.0                          | +7.0       | - |
| 8         | 7.7 | 54 | 4  | 288 | 5     | 71 | 51    | -70 | +  | 28     | -      | +3.1                          | +6.9       | - |
| 9         | 7.7 | 54 | 23 | 288 | 46    | 71 | 10    | -70 | +  | 29     | -      | +3.2                          | +6.8       | - |
| 10        | 7.7 | 54 | 43 | 289 | 26    | 70 | 30    | -69 | +  | 31     | -      | +3.3                          | +6.7       | - |
| 11        | 7.7 | 55 | 4  | 290 | 6     | 69 | 50    | -69 | +  | 33     | -      | +3.4                          | +6.6       | - |
| 12        | 7.7 | 55 | 24 | 290 | 45    | 69 | 11    | -68 | +  | 34     | -      | +3.5                          | +6.4       | - |
| 13        | 7.7 | 55 | 46 | 291 | 23    | 68 | 33    | -68 | +  | 36     | -      | +3.7                          | +6.3       | - |
| 14        | 7.7 | 56 | 8  | 292 | 1     | 67 | 55    | -67 | +  | 37     | -      | +3.8                          | +6.2       | - |
| 15        | 7.7 | 56 | 31 | 292 | 38    | 67 | 18    | -67 | +  | 38     | -      | +3.8                          | +6.1       | - |
| 16        | 7.7 | 56 | 54 | 293 | 14    | 66 | 42    | -66 | +  | 40     | -      | +3.9                          | +6.0       | - |
| 17        | 7.7 | 57 | 18 | 293 | 49    | 66 | 6     | -65 | +  | 41     | -      | +4.0                          | +5.9       | - |
| 18        | 7.7 | 57 | 43 | 294 | 24    | 65 | 31    | -65 | +  | 42     | -      | +4.1                          | +5.8       | - |
| 19        | 7.7 | 58 | 8  | 294 | 58    | 64 | 57    | -64 | +  | 44     | -      | +4.3                          | +5.6       | - |
| +20       | 7.7 | 58 | 34 | 295 | 32    | 64 | 24    | -63 | +  | 45     | -      | +4.3                          | +5.5       | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| +0        | +0.05      | -0.1       | -0.3         | +0.3         |
| 5         | 0.05       | 0.1        | 0.2          | 0.3          |
| 10        | 0.05       | 0.1        | 0.2          | 0.2          |
| 15        | 0.05       | 0.1        | 0.2          | 0.2          |
| +20       | +0.05      | -0.2       | -0.2         | +0.2         |



TABLE II.

|            | No.   | Star               | Mag. | $\alpha_{1950}$ | $\delta_{1950}$ |
|------------|-------|--------------------|------|-----------------|-----------------|
| Pair No. 3 | E 31  | $\delta$ Eridani   | 3.7  | 3 40.9          | -9 56           |
|            | W 174 | $\epsilon$ Aquarii | 3.8  | 20 45.0         | -9 41           |

| $\phi$ | S    |    | z  |     | $A_E$ |    | $A_W$ |     | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |              |              |
|--------|------|----|----|-----|-------|----|-------|-----|-----|--------|--------|------------------------------|--------------|--------------|
|        | h    | m  | °  | '   | °     | '  | °     | '   |     |        |        | $\Delta z$                   | $\Delta A_E$ | $\Delta A_W$ |
| +0     | 13.0 | 53 | 15 | 282 | 26    | 77 | 53    | -73 | +12 | -      | +2.1   | +7.3                         | -            |              |
| 1      | 13.0 | 53 | 28 | 283 | 10    | 77 | 10    | -73 | +14 | -      | +2.3   | +7.2                         | -            |              |
| 2      | 13.0 | 53 | 42 | 283 | 53    | 76 | 27    | -73 | +16 | -      | +2.4   | +7.1                         | -            |              |
| 3      | 13.0 | 53 | 57 | 284 | 35    | 75 | 44    | -73 | +18 | -      | +2.5   | +7.1                         | -            |              |
| 4      | 13.0 | 54 | 12 | 285 | 17    | 75 | 2     | -72 | +20 | -      | +2.6   | +7.0                         | -            |              |
| 5      | 13.0 | 54 | 28 | 285 | 59    | 74 | 21    | -72 | +22 | -      | +2.7   | +6.9                         | -            |              |
| 6      | 13.1 | 54 | 45 | 286 | 40    | 73 | 40    | -72 | +23 | -      | +2.8   | +6.8                         | -            |              |
| 7      | 13.1 | 55 | 2  | 287 | 20    | 72 | 59    | -71 | +25 | -      | +2.9   | +6.7                         | -            |              |
| 8      | 13.1 | 55 | 20 | 288 | 0     | 72 | 20    | -71 | +27 | -      | +3.1   | +6.6                         | -            |              |
| 9      | 13.1 | 55 | 39 | 288 | 39    | 71 | 40    | -70 | +28 | -      | +3.2   | +6.5                         | -            |              |
| 10     | 13.1 | 55 | 58 | 289 | 18    | 71 | 2     | -70 | +30 | -      | +3.3   | +6.4                         | -            |              |
| 11     | 13.1 | 56 | 18 | 289 | 56    | 70 | 24    | -69 | +32 | -      | +3.4   | +6.3                         | -            |              |
| 12     | 13.1 | 56 | 38 | 290 | 33    | 69 | 47    | -69 | +33 | -      | +3.5   | +6.2                         | -            |              |
| 13     | 13.1 | 57 | 0  | 291 | 10    | 69 | 10    | -68 | +34 | -      | +3.6   | +6.1                         | -            |              |
| 14     | 13.1 | 57 | 21 | 291 | 46    | 68 | 34    | -67 | +36 | -      | +3.7   | +6.0                         | -            |              |
| 15     | 13.2 | 57 | 44 | 292 | 21    | 67 | 59    | -67 | +37 | -      | +3.8   | +5.9                         | -            |              |
| 16     | 13.2 | 58 | 7  | 292 | 56    | 67 | 24    | -66 | +39 | -      | +3.9   | +5.7                         | -            |              |
| 17     | 13.2 | 58 | 30 | 293 | 30    | 66 | 50    | -66 | +40 | -      | +4.0   | +5.6                         | -            |              |
| 18     | 13.2 | 58 | 54 | 294 | 4     | 66 | 16    | -65 | +41 | -      | +4.0   | +5.5                         | -            |              |
| 19     | 13.2 | 59 | 19 | 294 | 36    | 65 | 44    | -64 | +42 | -      | +4.1   | +5.4                         | -            |              |
| +20    | 13.2 | 59 | 44 | 295 | 8     | 65 | 12    | -64 | +44 | -      | +4.2   | +5.3                         | -            |              |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| 0      | m          | '          | '            | '            |
| +0     | +0.05      | -0.1       | -0.2         | +0.3         |
| 5      | 0.05       | 0.1        | 0.2          | 0.3          |
| 10     | 0.05       | 0.1        | 0.2          | 0.2          |
| 15     | 0.05       | 0.1        | 0.2          | 0.2          |
| +20    | +0.05      | -0.1       | -0.2         | +0.2         |

DATA REQUIRED FOR OBSERVATION.

|            | No.   | Star            | Mag. | $\alpha_{1950}$ | $\delta_{1950}$ |
|------------|-------|-----------------|------|-----------------|-----------------|
| Pair No. 4 | E 22  | $\pi$ Ceti      | 4.4  | 2 41.7          | -14 4           |
|            | W 181 | $\iota$ Aquarii | 4.4  | 22 3.7          | -14 7           |

| $\phi$ | S    |    | z  |     | $A_E$ |    | $A_W$ |     | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |              |              |
|--------|------|----|----|-----|-------|----|-------|-----|-----|--------|--------|------------------------------|--------------|--------------|
|        | h    | m  | °  | '   | °     | '  | °     | '   |     |        |        | $\Delta z$                   | $\Delta A_E$ | $\Delta A_W$ |
| +0     | 22.7 | 37 | 44 | 293 | 24    | 66 | 32    | -69 | +40 | -      | +4.0   | +11.9                        | -            |              |
| 1      | 22.7 | 38 | 9  | 294 | 34    | 65 | 21    | -68 | +43 | -      | +4.2   | +11.6                        | -            |              |
| 2      | 22.7 | 38 | 34 | 295 | 43    | 64 | 13    | -67 | +45 | -      | +4.3   | +11.3                        | -            |              |
| 3      | 22.7 | 39 | 1  | 296 | 50    | 63 | 6     | -67 | +47 | -      | +4.5   | +11.0                        | -            |              |
| 4      | 22.7 | 39 | 28 | 297 | 55    | 62 | 1     | -66 | +50 | -      | +4.7   | +10.7                        | -            |              |
| 5      | 22.7 | 39 | 57 | 298 | 58    | 60 | 57    | -65 | +51 | -      | +4.9   | +10.4                        | -            |              |
| 6      | 22.7 | 40 | 27 | 300 | 0     | 59 | 55    | -64 | +53 | -      | +5.0   | +10.2                        | -            |              |
| 7      | 22.7 | 40 | 57 | 301 | 0     | 58 | 55    | -64 | +55 | -      | +5.2   | +9.9                         | -            |              |
| 8      | 22.7 | 41 | 28 | 301 | 59    | 57 | 57    | -63 | +56 | -      | +5.3   | +9.6                         | -            |              |
| 9      | 22.7 | 42 | 1  | 302 | 55    | 57 | 0     | -62 | +58 | -      | +5.5   | +9.3                         | -            |              |
| 10     | 22.7 | 42 | 34 | 303 | 50    | 56 | 5     | -61 | +59 | -      | +5.6   | +9.0                         | -            |              |
| 11     | 22.7 | 43 | 8  | 304 | 44    | 55 | 12    | -60 | +61 | -      | +5.7   | +8.8                         | -            |              |
| 12     | 22.7 | 43 | 42 | 305 | 36    | 54 | 20    | -59 | +62 | -      | +5.8   | +8.5                         | -            |              |
| 13     | 22.7 | 44 | 17 | 306 | 26    | 53 | 30    | -58 | +63 | -      | +5.9   | +8.2                         | -            |              |
| 14     | 22.7 | 44 | 53 | 307 | 15    | 52 | 41    | -58 | +64 | -      | +6.1   | +8.0                         | -            |              |
| 15     | 22.7 | 45 | 30 | 308 | 2     | 51 | 54    | -57 | +65 | -      | +6.2   | +7.7                         | -            |              |
| 16     | 22.7 | 46 | 7  | 308 | 47    | 51 | 8     | -56 | +65 | -      | +6.3   | +7.5                         | -            |              |
| 17     | 22.7 | 46 | 45 | 309 | 32    | 50 | 24    | -55 | +66 | -      | +6.4   | +7.3                         | -            |              |
| 18     | 22.7 | 47 | 24 | 310 | 14    | 49 | 41    | -54 | +67 | -      | +6.5   | +7.0                         | -            |              |
| 19     | 22.7 | 48 | 3  | 310 | 56    | 48 | 59    | -53 | +67 | -      | +6.6   | +6.8                         | -            |              |
| +20    | 22.7 | 48 | 42 | 311 | 36    | 48 | 19    | -52 | +68 | -      | +6.7   | +6.6                         | -            |              |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| 0      | m          | '          | '            | '            |
| +0     | +0.05      | -0.1       | -0.4         | +0.4         |
| 5      | 0.05       | 0.2        | 0.3          | 0.4          |
| 10     | 0.05       | 0.2        | 0.3          | 0.3          |
| 15     | 0.05       | 0.2        | 0.2          | 0.3          |
| +20    | +0.05      | -0.2       | -0.2         | +0.3         |



Pair No. 5  
 E 27 o Tauri 3.8 3 22.1 +8 51  
 W 179 ε Pegasi 2.5 21 41.7 +9 39

| φ   | S    | z     | A <sub>E</sub> | A <sub>W</sub> | dz  | dA <sub>E</sub> | dA <sub>W</sub> | Var. for Δφ = +10' |       |   |
|-----|------|-------|----------------|----------------|-----|-----------------|-----------------|--------------------|-------|---|
|     |      |       |                |                |     |                 |                 | Δz                 | E     | W |
| +0  | 31.6 | 43 58 | 257 12         | 103 58         | -73 | -19             | +               | -2.3               | +10.1 | - |
| 1   | 31.7 | 43 44 | 258 13         | 102 57         | -73 | -16             | +               | -2.2               | +10.2 | - |
| 2   | 31.7 | 43 32 | 259 14         | 101 56         | -74 | -13             | +               | -2.0               | +10.3 | - |
| 3   | 31.8 | 43 21 | 260 17         | 100 54         | -74 | -11             | +               | -1.8               | +10.4 | - |
| 4   | 31.8 | 43 11 | 261 19         | 99 51          | -74 | -8              | +               | -1.6               | +10.5 | - |
| 5   | 31.8 | 43 1  | 262 23         | 98 48          | -74 | -5              | +               | -1.4               | +10.6 | - |
| 6   | 31.9 | 42 53 | 263 27         | 97 44          | -74 | -2              | +               | -1.2               | +10.7 | - |
| 7   | 31.9 | 42 47 | 264 31         | 96 40          | -74 | 0               |                 | -1.1               | +10.8 | - |
| 8   | 32.0 | 42 41 | 265 36         | 95 35          | -74 | +3              | -               | -0.9               | +10.8 | - |
| 9   | 32.0 | 42 36 | 266 41         | 94 30          | -74 | +6              | -               | -0.7               | +10.9 | - |
| 10  | 32.1 | 42 33 | 267 46         | 93 25          | -74 | +9              | -               | -0.5               | +10.9 | - |
| 11  | 32.1 | 42 30 | 268 52         | 92 20          | -74 | +12             | -               | -0.3               | +10.9 | - |
| 12  | 32.1 | 42 29 | 269 57         | 91 14          | -73 | +15             | -               | -0.1               | +10.9 | - |
| 13  | 32.2 | 42 29 | 271 3          | 90 9           | -73 | +18             | -               | +0.1               | +10.9 | - |
| 14  | 32.2 | 42 30 | 272 9          | 89 4           | -73 | +21             | -               | +0.3               | +10.9 | - |
| 15  | 32.3 | 42 32 | 273 14         | 87 59          | -72 | +23             | -               | +0.5               | +10.9 | - |
| 16  | 32.3 | 42 35 | 274 20         | 86 53          | -72 | +26             | -               | +0.6               | +10.9 | - |
| 17  | 32.4 | 42 40 | 275 25         | 85 49          | -72 | +29             | -               | +0.8               | +10.8 | - |
| 18  | 32.4 | 42 45 | 276 30         | 84 44          | -71 | +32             | -               | +1.0               | +10.8 | - |
| 19  | 32.5 | 42 52 | 277 34         | 83 40          | -70 | +34             | -               | +1.2               | +10.7 | - |
| +20 | 32.5 | 43 0  | 278 38         | 82 36          | -70 | +37             | -               | +1.4               | +10.7 | - |

Annual Precessions of S, z, A<sub>E</sub>, and A<sub>W</sub>.

| φ   | δS    | δz   | δA <sub>E</sub> | δA <sub>W</sub> |
|-----|-------|------|-----------------|-----------------|
| +0  | +0.05 | +0.1 | -0.3            | +0.4            |
| 5   | 0.05  | +0.1 | 0.3             | 0.4             |
| 10  | 0.05  | 0.0  | 0.3             | 0.4             |
| 15  | 0.05  | 0.0  | 0.3             | 0.4             |
| +20 | +0.05 | -0.1 | -0.3            | +0.4            |

Pair No. 6  
 E 23 μ Ceti 4.4 2 42.2 +9 54  
 W 186 ζ Pegasi 3.6 22 39.0 +10 34

| φ   | S    | z     | A <sub>E</sub> | A <sub>W</sub> | dz  | dA <sub>E</sub> | dA <sub>W</sub> | Var. for Δφ = +10' |       |   |
|-----|------|-------|----------------|----------------|-----|-----------------|-----------------|--------------------|-------|---|
|     |      |       |                |                |     |                 |                 | Δz                 | E     | W |
| +0  | 40.2 | 32 31 | 251 22         | 109 58         | -71 | -40             | +               | -3.3               | +14.8 | - |
| 1   | 40.2 | 32 12 | 252 51         | 108 28         | -71 | -37             | +               | -3.1               | +15.1 | - |
| 2   | 40.3 | 31 54 | 254 23         | 106 56         | -72 | -33             | +               | -2.8               | +15.4 | - |
| 3   | 40.3 | 31 38 | 255 56         | 105 23         | -72 | -28             | +               | -2.5               | +15.7 | - |
| 4   | 40.4 | 31 24 | 257 31         | 103 48         | -73 | -24             | +               | -2.3               | +16.0 | - |
| 5   | 40.4 | 31 11 | 259 8          | 102 12         | -73 | -19             | +               | -2.0               | +16.2 | - |
| 6   | 40.5 | 31 0  | 260 46         | 100 34         | -73 | -14             | +               | -1.7               | +16.4 | - |
| 7   | 40.5 | 30 51 | 262 25         | 98 55          | -74 | -9              | +               | -1.4               | +16.6 | - |
| 8   | 40.6 | 30 43 | 264 4          | 97 15          | -74 | -4              | +               | -1.2               | +16.7 | - |
| 9   | 40.6 | 30 37 | 265 45         | 95 35          | -74 | +1              | -               | -0.9               | +16.8 | - |
| 10  | 40.7 | 30 32 | 267 27         | 93 54          | -74 | +6              | -               | -0.6               | +17.0 | - |
| 11  | 40.7 | 30 30 | 269 9          | 92 12          | -73 | +11             | -               | -0.3               | +17.0 | - |
| 12  | 40.8 | 30 29 | 270 50         | 90 30          | -73 | +16             | -               | 0.0                | +17.0 | - |
| 13  | 40.8 | 30 30 | 272 32         | 88 49          | -73 | +21             | -               | +0.3               | +17.0 | - |
| 14  | 40.9 | 30 33 | 274 14         | 87 8           | -73 | +26             | -               | +0.6               | +16.9 | - |
| 15  | 40.9 | 30 38 | 275 55         | 85 26          | -72 | +31             | -               | +0.9               | +16.9 | - |
| 16  | 41.0 | 30 44 | 277 36         | 83 46          | -71 | +36             | -               | +1.2               | +16.7 | - |
| 17  | 41.0 | 30 52 | 279 16         | 82 6           | -71 | +41             | -               | +1.5               | +16.5 | - |
| 18  | 41.1 | 31 2  | 280 55         | 80 28          | -70 | +46             | -               | +1.8               | +16.4 | - |
| 19  | 41.1 | 31 13 | 282 33         | 78 51          | -69 | +50             | -               | +2.1               | +16.2 | - |
| +20 | 41.2 | 31 27 | 284 9          | 77 15          | -68 | +54             | -               | +2.4               | +16.0 | - |

Annual Precessions of S, z, A<sub>E</sub>, and A<sub>W</sub>.

| φ   | δS    | δz   | δA <sub>E</sub> | δA <sub>W</sub> |
|-----|-------|------|-----------------|-----------------|
| +0  | +0.05 | +0.1 | -0.4            | +0.6            |
| 5   | 0.05  | +0.1 | 0.5             | 0.6             |
| 10  | 0.05  | 0.0  | 0.5             | 0.6             |
| 15  | 0.05  | 0.0  | 0.5             | 0.6             |
| +20 | +0.05 | -0.1 | -0.5            | +0.6            |



TABLE II.

|            | No.   | Star               | Mag. | $\alpha_{1950}$ | $\delta_{1950}$ |
|------------|-------|--------------------|------|-----------------|-----------------|
| Pair No. 7 | E 37  | $\alpha^1$ Eridani | 4.1  | 4 9.4           | -6 58           |
|            | W 177 | $\beta$ Aquarii    | 3.1  | 21 28.9         | -5 48           |

| $\phi$ | S    |    | z  |     | $A_E$ |    | $A_W$ |     | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |            |   |
|--------|------|----|----|-----|-------|----|-------|-----|-----|--------|--------|------------------------------|------------|---|
|        | h    | m  | °  | '   | °     | '  | °     | '   |     |        |        | $\Delta z$                   | $\Delta A$ | E |
| +0     | 49.4 | 50 | 59 | 278 | 59    | 82 | 33    | -74 | +9  | -      | +1.4   | +8.0                         | -          |   |
| 1      | 49.5 | 51 | 8  | 279 | 47    | 81 | 45    | -74 | +11 | -      | +1.6   | +8.0                         | -          |   |
| 2      | 49.5 | 51 | 17 | 280 | 35    | 80 | 57    | -74 | +13 | -      | +1.7   | +7.9                         | -          |   |
| 3      | 49.6 | 51 | 28 | 281 | 22    | 80 | 10    | -74 | +15 | -      | +1.8   | +7.8                         | -          |   |
| 4      | 49.6 | 51 | 40 | 282 | 9     | 79 | 23    | -73 | +17 | -      | +2.0   | +7.8                         | -          |   |
| 5      | 49.7 | 51 | 52 | 282 | 55    | 78 | 37    | -73 | +19 | -      | +2.1   | +7.7                         | -          |   |
| 6      | 49.7 | 52 | 5  | 283 | 41    | 77 | 51    | -73 | +21 | -      | +2.2   | +7.6                         | -          |   |
| 7      | 49.8 | 52 | 19 | 284 | 26    | 77 | 6     | -72 | +23 | -      | +2.4   | +7.5                         | -          |   |
| 8      | 49.8 | 52 | 33 | 285 | 11    | 76 | 21    | -72 | +25 | -      | +2.5   | +7.4                         | -          |   |
| 9      | 49.9 | 52 | 48 | 285 | 56    | 75 | 37    | -71 | +27 | -      | +2.6   | +7.4                         | -          |   |
| 10     | 49.9 | 53 | 4  | 286 | 39    | 74 | 54    | -71 | +29 | -      | +2.7   | +7.3                         | -          |   |
| 11     | 50.0 | 53 | 21 | 287 | 23    | 74 | 11    | -70 | +31 | -      | +2.9   | +7.2                         | -          |   |
| 12     | 50.1 | 53 | 39 | 288 | 5     | 73 | 29    | -70 | +32 | -      | +3.0   | +7.0                         | -          |   |
| 13     | 50.1 | 53 | 57 | 288 | 47    | 72 | 47    | -69 | +34 | -      | +3.1   | +6.9                         | -          |   |
| 14     | 50.2 | 54 | 16 | 289 | 29    | 72 | 6     | -69 | +36 | -      | +3.2   | +6.9                         | -          |   |
| 15     | 50.2 | 54 | 35 | 290 | 9     | 71 | 26    | -68 | +37 | -      | +3.3   | +6.8                         | -          |   |
| 16     | 50.3 | 54 | 56 | 290 | 50    | 70 | 46    | -68 | +39 | -      | +3.4   | +6.6                         | -          |   |
| 17     | 50.3 | 55 | 17 | 291 | 29    | 70 | 7     | -67 | +40 | -      | +3.5   | +6.5                         | -          |   |
| 18     | 50.4 | 55 | 38 | 292 | 8     | 69 | 29    | -66 | +42 | -      | +3.6   | +6.4                         | -          |   |
| 19     | 50.5 | 56 | 0  | 292 | 46    | 68 | 51    | -66 | +43 | -      | +3.7   | +6.3                         | -          |   |
| +20    | 50.5 | 56 | 23 | 293 | 24    | 68 | 14    | -65 | +44 | -      | +3.8   | +6.2                         | -          |   |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| 0      | m          | '          | '            | '            |
| +0     | +0.05      | -0.1       | -0.2         | +0.3         |
| 5      | 0.05       | 0.1        | 0.2          | 0.3          |
| 10     | 0.05       | 0.1        | 0.2          | 0.3          |
| 15     | 0.05       | 0.1        | 0.2          | 0.3          |
| +20    | +0.05      | -0.1       | -0.1         | +0.3         |

DATA REQUIRED FOR OBSERVATION.

|            | No.   | Star           | Mag. | $\alpha_{1950}$ | $\delta_{1950}$ |
|------------|-------|----------------|------|-----------------|-----------------|
| Pair No. 8 | E 28  | $\xi$ Tauri    | 3.8  | 3 24.5          | +9 34           |
|            | W 186 | $\zeta$ Pegasi | 3.6  | 22 39.0         | +10 34          |

| $\phi$ | S   |    | z  |     | $A_E$ |     | $A_W$ |     | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |            |   |
|--------|-----|----|----|-----|-------|-----|-------|-----|-----|--------|--------|------------------------------|------------|---|
|        | h   | m  | °  | '   | °     | '   | °     | '   |     |        |        | $\Delta z$                   | $\Delta A$ | E |
| +0     | 1.2 | 37 | 30 | 254 | 11    | 107 | 33    | -72 | -29 | +      | -2.9   | +12.5                        | -          |   |
| 1      | 1.3 | 37 | 13 | 255 | 27    | 106 | 17    | -72 | -26 | +      | -2.7   | +12.7                        | -          |   |
| 2      | 1.3 | 36 | 58 | 256 | 43    | 105 | 1     | -73 | -23 | +      | -2.4   | +12.9                        | -          |   |
| 3      | 1.4 | 36 | 44 | 258 | 1     | 103 | 43    | -73 | -19 | +      | -2.2   | +13.1                        | -          |   |
| 4      | 1.5 | 36 | 31 | 259 | 20    | 102 | 24    | -73 | -16 | +      | -2.0   | +13.3                        | -          |   |
| 5      | 1.5 | 36 | 20 | 260 | 40    | 101 | 4     | -74 | -12 | +      | -1.8   | +13.4                        | -          |   |
| 6      | 1.6 | 36 | 10 | 262 | 1     | 99  | 44    | -74 | -8  | +      | -1.5   | +13.5                        | -          |   |
| 7      | 1.6 | 36 | 1  | 263 | 22    | 98  | 22    | -74 | -5  | +      | -1.3   | +13.6                        | -          |   |
| 8      | 1.7 | 35 | 54 | 264 | 44    | 97  | 0     | -74 | -1  | +      | -1.1   | +13.7                        | -          |   |
| 9      | 1.8 | 35 | 49 | 266 | 7     | 95  | 39    | -74 | +3  | -      | -0.8   | +13.8                        | -          |   |
| 10     | 1.8 | 35 | 44 | 267 | 30    | 94  | 15    | -74 | +7  | -      | -0.6   | +13.9                        | -          |   |
| 11     | 1.9 | 35 | 41 | 268 | 54    | 92  | 52    | -73 | +11 | -      | -0.3   | +14.0                        | -          |   |
| 12     | 2.0 | 35 | 40 | 270 | 18    | 91  | 28    | -73 | +15 | -      | -0.1   | +13.9                        | -          |   |
| 13     | 2.0 | 35 | 40 | 271 | 41    | 90  | 5     | -73 | +19 | -      | +0.1   | +13.9                        | -          |   |
| 14     | 2.1 | 35 | 42 | 273 | 5     | 88  | 42    | -73 | +22 | -      | +0.4   | +14.0                        | -          |   |
| 15     | 2.1 | 35 | 45 | 274 | 29    | 87  | 19    | -72 | +26 | -      | +0.6   | +13.9                        | -          |   |
| 16     | 2.2 | 35 | 49 | 275 | 52    | 85  | 56    | -72 | +30 | -      | +0.9   | +13.9                        | -          |   |
| 17     | 2.3 | 35 | 55 | 277 | 15    | 84  | 34    | -71 | +34 | -      | +1.1   | +13.7                        | -          |   |
| 18     | 2.3 | 36 | 2  | 278 | 37    | 83  | 12    | -71 | +37 | -      | +1.3   | +13.6                        | -          |   |
| 19     | 2.4 | 36 | 11 | 279 | 59    | 81  | 51    | -70 | +41 | -      | +1.6   | +13.5                        | -          |   |
| +20    | 2.5 | 36 | 21 | 281 | 20    | 80  | 31    | -69 | +44 | -      | +1.8   | +13.4                        | -          |   |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| 0      | m          | '          | '            | '            |
| +0     | +0.05      | +0.1       | -0.3         | +0.5         |
| 5      | 0.05       | +0.1       | 0.4          | 0.5          |
| 10     | 0.05       | 0.0        | 0.4          | 0.6          |
| 15     | 0.05       | 0.0        | 0.4          | 0.6          |
| +20    | +0.05      | -0.1       | -0.4         | +0.5         |





TABLE II.

| Pair No. | E | No. | Star             | Mag. | $\alpha_{1950}$ |      | $\delta_{1950}$ |    |
|----------|---|-----|------------------|------|-----------------|------|-----------------|----|
|          |   |     |                  |      | h               | m    | °               | '  |
| 9        | E | 26  | $\alpha$ Ceti    | 2.8  | 2               | 59.7 | +3              | 54 |
|          | W | 193 | $\gamma$ Piscium | 3.9  | 23              | 14.6 | +3              | 1  |

| $\varphi$ | S |     | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |      |   |      |   |
|-----------|---|-----|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------|---|------|---|
|           | h | m   | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | E    | W |      |   |
| +0        | 1 | 7.3 | 28 | 57 | 261   | 55 | 96    | 12 | -74 | -      | 18     | +                               | -1.3 | + | 18.0 | - |
| 1         |   | 7.3 | 28 | 50 | 263   | 44 | 94    | 24 | -75 | -      | 12     | +                               | -0.9 | + | 18.1 | - |
| 2         |   | 7.2 | 28 | 46 | 265   | 32 | 92    | 35 | -75 | -      | 6      | +                               | -0.6 | + | 18.1 | - |
| 3         |   | 7.1 | 28 | 43 | 267   | 21 | 90    | 46 | -75 |        | 0      |                                 | -0.3 | + | 18.2 | - |
| 4         |   | 7.1 | 28 | 42 | 269   | 10 | 88    | 57 | -75 | +      | 6      | -                               | 0.0  | + | 18.2 | - |
| 5         |   | 7.0 | 28 | 43 | 271   | 0  | 87    | 7  | -75 | +      | 12     | -                               | +0.3 | + | 18.2 | - |
| 6         |   | 6.9 | 28 | 46 | 272   | 49 | 85    | 18 | -75 | +      | 17     | -                               | +0.7 | + | 18.1 | - |
| 7         |   | 6.9 | 28 | 51 | 274   | 38 | 83    | 29 | -74 | +      | 23     | -                               | +1.0 | + | 18.0 | - |
| 8         |   | 6.8 | 28 | 58 | 276   | 25 | 81    | 41 | -74 | +      | 29     | -                               | +1.3 | + | 17.9 | - |
| 9         |   | 6.7 | 29 | 7  | 278   | 12 | 79    | 54 | -73 | +      | 34     | -                               | +1.6 | + | 17.7 | - |
| 10        |   | 6.7 | 29 | 17 | 279   | 58 | 78    | 8  | -72 | +      | 39     | -                               | +1.9 | + | 17.5 | - |
| 11        |   | 6.6 | 29 | 29 | 281   | 42 | 76    | 23 | -72 | +      | 44     | -                               | +2.2 | + | 17.2 | - |
| 12        |   | 6.5 | 29 | 43 | 283   | 24 | 74    | 41 | -71 | +      | 49     | -                               | +2.5 | + | 16.9 | - |
| 13        |   | 6.5 | 29 | 59 | 285   | 5  | 73    | 0  | -70 | +      | 54     | -                               | +2.8 | + | 16.6 | - |
| 14        |   | 6.4 | 30 | 16 | 286   | 43 | 71    | 21 | -69 | +      | 58     | -                               | +3.0 | + | 16.3 | - |
| 15        |   | 6.3 | 30 | 36 | 288   | 20 | 69    | 43 | -68 | +      | 62     | -                               | +3.3 | + | 16.0 | - |
| 16        |   | 6.2 | 30 | 56 | 289   | 55 | 68    | 8  | -67 | +      | 66     | -                               | +3.6 | + | 15.6 | - |
| 17        |   | 6.2 | 31 | 18 | 291   | 27 | 66    | 35 | -66 | +      | 69     | -                               | +3.8 | + | 15.2 | - |
| 18        |   | 6.1 | 31 | 42 | 292   | 57 | 65    | 5  | -65 | +      | 72     | -                               | +4.1 | + | 14.7 | - |
| 19        |   | 6.0 | 32 | 7  | 294   | 24 | 63    | 37 | -64 | +      | 75     | -                               | +4.3 | + | 14.3 | - |
| +20       | 1 | 6.0 | 32 | 33 | 295   | 48 | 62    | 12 | -62 | +      | 77     | -                               | +4.5 | + | 13.9 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| +0        | +0.05      | 0.0        | -0.5         | +0.7         |
| 5         | 0.05       | 0.0        | 0.5          | 0.7          |
| 10        | 0.05       | -0.1       | 0.5          | 0.7          |
| 15        | 0.05       | 0.1        | 0.4          | 0.6          |
| +20       | +0.05      | -0.2       | -0.4         | +0.6         |

DATA REQUIRED FOR OBSERVATION.

| Pair No. | E | No. | Star            | Mag. | $\alpha_{1950}$ |      | $\delta_{1950}$ |    |
|----------|---|-----|-----------------|------|-----------------|------|-----------------|----|
|          |   |     |                 |      | h               | m    | °               | '  |
| 10       | E | 42  | $\beta$ Eridani | 2.9  | 5               | 5.4  | -5              | 9  |
|          | W | 177 | $\beta$ Aquarii | 3.1  | 21              | 28.9 | -5              | 48 |

| $\varphi$ | S |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |      |   |     |   |
|-----------|---|------|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------|---|-----|---|
|           | h | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | E    | W |     |   |
| +0        | 1 | 17.1 | 57 | 51 | 276   | 5  | 83    | 9  | -75 | +      | 5      | -                               | +1.2 | + | 6.2 | - |
| 1         |   | 17.1 | 57 | 58 | 276   | 42 | 82    | 32 | -75 | +      | 7      | -                               | +1.3 | + | 6.2 | - |
| 2         |   | 17.0 | 58 | 6  | 277   | 19 | 81    | 55 | -74 | +      | 9      | -                               | +1.4 | + | 6.1 | - |
| 3         |   | 17.0 | 58 | 14 | 277   | 56 | 81    | 18 | -74 | +      | 11     | -                               | +1.5 | + | 6.1 | - |
| 4         |   | 17.0 | 58 | 23 | 278   | 33 | 80    | 41 | -74 | +      | 13     | -                               | +1.6 | + | 6.1 | - |
| 5         |   | 17.0 | 58 | 33 | 279   | 9  | 80    | 5  | -74 | +      | 15     | -                               | +1.7 | + | 6.0 | - |
| 6         |   | 16.9 | 58 | 44 | 279   | 45 | 79    | 29 | -74 | +      | 17     | -                               | +1.8 | + | 6.0 | - |
| 7         |   | 16.9 | 58 | 54 | 280   | 21 | 78    | 53 | -73 | +      | 18     | -                               | +1.9 | + | 5.9 | - |
| 8         |   | 16.9 | 59 | 6  | 280   | 56 | 78    | 18 | -73 | +      | 20     | -                               | +2.0 | + | 5.9 | - |
| 9         |   | 16.8 | 59 | 18 | 281   | 31 | 77    | 43 | -72 | +      | 22     | -                               | +2.1 | + | 5.8 | - |
| 10        |   | 16.8 | 59 | 31 | 282   | 6  | 77    | 8  | -72 | +      | 24     | -                               | +2.2 | + | 5.7 | - |
| 11        |   | 16.8 | 59 | 44 | 282   | 40 | 76    | 34 | -72 | +      | 25     | -                               | +2.3 | + | 5.7 | - |
| 12        |   | 16.8 | 59 | 58 | 283   | 13 | 76    | 0  | -71 | +      | 27     | -                               | +2.4 | + | 5.6 | - |
| 13        |   | 16.7 | 60 | 13 | 283   | 47 | 75    | 26 | -71 | +      | 29     | -                               | +2.5 | + | 5.5 | - |
| 14        |   | 16.7 | 60 | 28 | 284   | 20 | 74    | 53 | -70 | +      | 30     | -                               | +2.6 | + | 5.4 | - |
| 15        |   | 16.7 | 60 | 43 | 284   | 52 | 74    | 20 | -70 | +      | 32     | -                               | +2.6 | + | 5.4 | - |
| 16        |   | 16.6 | 60 | 59 | 285   | 24 | 73    | 48 | -69 | +      | 34     | -                               | +2.7 | + | 5.3 | - |
| 17        |   | 16.6 | 61 | 16 | 285   | 56 | 73    | 16 | -69 | +      | 35     | -                               | +2.8 | + | 5.2 | - |
| 18        |   | 16.6 | 61 | 33 | 286   | 27 | 72    | 45 | -68 | +      | 37     | -                               | +2.9 | + | 5.2 | - |
| 19        |   | 16.6 | 61 | 51 | 286   | 58 | 72    | 14 | -68 | +      | 38     | -                               | +3.0 | + | 5.1 | - |
| +20       | 1 | 16.5 | 62 | 9  | 287   | 28 | 71    | 43 | -67 | +      | 40     | -                               | +3.1 | + | 5.0 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| +0        | +0.05      | 0.0        | -0.1         | +0.3         |
| 5         | 0.05       | 0.0        | 0.1          | 0.3          |
| 10        | 0.05       | 0.0        | 0.1          | 0.3          |
| 15        | 0.05       | 0.0        | 0.1          | 0.3          |
| +20       | +0.05      | 0.0        | -0.1         | +0.3         |



TABLE II.

| Pair No. | E | No. | Star            | Mag. | $\alpha_{1950}$ |      | $\delta_{1950}$ |    |
|----------|---|-----|-----------------|------|-----------------|------|-----------------|----|
|          |   |     |                 |      | h               | m    | °               | '  |
| 11       | E | 45  | $\tau$ Orionis  | 3.7  | 5               | 15.2 | -6              | 54 |
|          | W | 177 | $\beta$ Aquarii | 3.1  | 21              | 28.9 | -5              | 48 |

| $\phi$ | S | z    | $A_E$ | $A_W$ | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |            |     |   |      |      |   |
|--------|---|------|-------|-------|-----|--------|--------|------------------------------|------------|-----|---|------|------|---|
|        |   |      |       |       |     |        |        | $\Delta z$                   | $\Delta A$ |     |   |      |      |   |
|        | h | m    | °     | '     | °   | '      | '      | '                            | '          | '   | ' |      |      |   |
| +0     | I | 22.2 | 59    | 7     | 278 | 3      | 83     | 15                           | -74        | +6  | - | +1.3 | +5.9 | - |
| 1      |   | 22.3 | 59    | 15    | 278 | 38     | 82     | 40                           | -74        | +8  | - | +1.4 | +5.9 | - |
| 2      |   | 22.3 | 59    | 24    | 279 | 14     | 82     | 5                            | -74        | +10 | - | +1.5 | +5.9 | - |
| 3      |   | 22.3 | 59    | 33    | 279 | 49     | 81     | 30                           | -74        | +11 | - | +1.6 | +5.8 | - |
| 4      |   | 22.4 | 59    | 43    | 280 | 23     | 80     | 55                           | -74        | +13 | - | +1.7 | +5.8 | - |
| 5      |   | 22.4 | 59    | 53    | 280 | 58     | 80     | 21                           | -74        | +15 | - | +1.8 | +5.7 | - |
| 6      |   | 22.5 | 60    | 4     | 281 | 32     | 79     | 47                           | -73        | +16 | - | +1.9 | +5.7 | - |
| 7      |   | 22.5 | 60    | 16    | 282 | 6      | 79     | 13                           | -73        | +18 | - | +2.0 | +5.6 | - |
| 8      |   | 22.6 | 60    | 28    | 282 | 39     | 78     | 40                           | -73        | +20 | - | +2.1 | +5.6 | - |
| 9      |   | 22.6 | 60    | 41    | 283 | 12     | 78     | 7                            | -72        | +21 | - | +2.2 | +5.5 | - |
| 10     |   | 22.7 | 60    | 54    | 283 | 45     | 77     | 34                           | -72        | +23 | - | +2.3 | +5.5 | - |
| 11     |   | 22.7 | 61    | 8     | 284 | 18     | 77     | 2                            | -71        | +24 | - | +2.4 | +5.4 | - |
| 12     |   | 22.8 | 61    | 22    | 284 | 50     | 76     | 30                           | -71        | +26 | - | +2.4 | +5.3 | - |
| 13     |   | 22.8 | 61    | 37    | 285 | 21     | 75     | 59                           | -71        | +27 | - | +2.5 | +5.3 | - |
| 14     |   | 22.9 | 61    | 53    | 285 | 53     | 75     | 28                           | -70        | +29 | - | +2.6 | +5.2 | - |
| 15     |   | 22.9 | 62    | 9     | 286 | 24     | 74     | 57                           | -70        | +30 | - | +2.7 | +5.1 | - |
| 16     |   | 23.0 | 62    | 25    | 286 | 54     | 74     | 27                           | -69        | +32 | - | +2.8 | +5.1 | - |
| 17     |   | 23.0 | 62    | 42    | 287 | 24     | 73     | 57                           | -69        | +33 | - | +2.9 | +5.0 | - |
| 18     |   | 23.1 | 63    | 0     | 287 | 54     | 73     | 28                           | -68        | +34 | - | +3.0 | +4.9 | - |
| 19     |   | 23.1 | 63    | 18    | 288 | 23     | 73     | 0                            | -67        | +36 | - | +3.0 | +4.8 | - |
| +20    | I | 23.2 | 63    | 36    | 288 | 52     | 72     | 31                           | -67        | +37 | - | +3.1 | +4.7 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| °      | m          | '          | '            | '            |
| +0     | +0.05      | 0.0        | -0.1         | +0.3         |
| 5      | 0.05       | -0.1       | 0.1          | 0.3          |
| 10     | 0.05       | 0.1        | -0.1         | 0.3          |
| 15     | 0.05       | 0.1        | 0.0          | 0.3          |
| +20    | +0.05      | -0.1       | 0.0          | +0.3         |

DATA REQUIRED FOR OBSERVATION.

| Pair No. | E | No. | Star            | Mag. | $\alpha_{1950}$ |      | $\delta_{1950}$ |    |
|----------|---|-----|-----------------|------|-----------------|------|-----------------|----|
|          |   |     |                 |      | h               | m    | °               | '  |
| 12       | E | 43  | $\mu$ Leporis   | 3.3  | 5               | 10.7 | -16             | 16 |
|          | W | 178 | $\gamma$ Capric | 3.8  | 21              | 37.3 | -16             | 53 |

| $\phi$ | S | z    | $A_E$ | $A_W$ | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |            |     |   |      |      |   |
|--------|---|------|-------|-------|-----|--------|--------|------------------------------|------------|-----|---|------|------|---|
|        |   |      |       |       |     |        |        | $\Delta z$                   | $\Delta A$ |     |   |      |      |   |
|        | h | m    | °     | '     | °   | '      | '      | '                            | '          | '   | ' |      |      |   |
| +0     | I | 23.8 | 58    | 49    | 289 | 6      | 70     | 9                            | -71        | +16 | - | +3.3 | +5.7 | - |
| 1      |   | 23.7 | 59    | 9     | 289 | 40     | 69     | 35                           | -70        | +17 | - | +3.4 | +5.6 | - |
| 2      |   | 23.7 | 59    | 30    | 290 | 14     | 69     | 1                            | -70        | +19 | - | +3.5 | +5.5 | - |
| 3      |   | 23.7 | 59    | 51    | 290 | 46     | 68     | 29                           | -70        | +20 | - | +3.6 | +5.4 | - |
| 4      |   | 23.7 | 60    | 13    | 291 | 19     | 67     | 56                           | -70        | +22 | - | +3.7 | +5.3 | - |
| 5      |   | 23.6 | 60    | 36    | 291 | 50     | 67     | 25                           | -69        | +23 | - | +3.8 | +5.2 | - |
| 6      |   | 23.6 | 60    | 59    | 292 | 21     | 66     | 54                           | -69        | +24 | - | +3.9 | +5.1 | - |
| 7      |   | 23.6 | 61    | 22    | 292 | 51     | 66     | 23                           | -68        | +26 | - | +3.9 | +5.0 | - |
| 8      |   | 23.5 | 61    | 46    | 293 | 21     | 65     | 53                           | -68        | +27 | - | +4.0 | +4.9 | - |
| 9      |   | 23.5 | 62    | 10    | 293 | 50     | 65     | 24                           | -68        | +28 | - | +4.1 | +4.8 | - |
| 10     |   | 23.5 | 62    | 35    | 294 | 19     | 64     | 56                           | -67        | +30 | - | +4.2 | +4.7 | - |
| 11     |   | 23.5 | 63    | 0     | 294 | 47     | 64     | 28                           | -67        | +31 | - | +4.3 | +4.6 | - |
| 12     |   | 23.4 | 63    | 26    | 295 | 14     | 64     | 0                            | -66        | +32 | - | +4.3 | +4.5 | - |
| 13     |   | 23.4 | 63    | 52    | 295 | 41     | 63     | 33                           | -66        | +33 | - | +4.4 | +4.4 | - |
| 14     |   | 23.4 | 64    | 19    | 296 | 7      | 63     | 6                            | -65        | +34 | - | +4.5 | +4.3 | - |
| 15     |   | 23.4 | 64    | 46    | 296 | 32     | 62     | 41                           | -64        | +35 | - | +4.5 | +4.2 | - |
| 16     |   | 23.3 | 65    | 13    | 296 | 57     | 62     | 16                           | -64        | +37 | - | +4.6 | +4.1 | - |
| 17     |   | 23.3 | 65    | 41    | 297 | 21     | 61     | 52                           | -63        | +38 | - | +4.7 | +4.0 | - |
| 18     |   | 23.3 | 66    | 9     | 297 | 45     | 61     | 28                           | -63        | +39 | - | +4.7 | +3.9 | - |
| 19     |   | 23.2 | 66    | 37    | 298 | 8      | 61     | 5                            | -62        | +40 | - | +4.8 | +3.8 | - |
| +20    | I | 23.2 | 67    | 6     | 298 | 30     | 60     | 42                           | -61        | +40 | - | +4.9 | +3.7 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| °      | m          | '          | '            | '            |
| +0     | +0.05      | -0.1       | -0.1         | +0.3         |
| 5      | 0.05       | -0.1       | 0.0          | 0.3          |
| 10     | 0.05       | 0.1        | 0.0          | 0.3          |
| 15     | 0.05       | 0.1        | 0.0          | 0.3          |
| +20    | +0.05      | -0.2       | 0.0          | +0.3         |



TABLE II.

|             | No.   | Star      | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|-------|-----------|------|---------------------------|---------------------------|
|             |       |           |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 13 | E 29  | 5 Tauri   | 4.3  | 3 28.1                    | +12 46                    |
|             | W 195 | 70 Pegasi | 4.7  | 23 26.6                   | +12 29                    |

| $\phi$ | S          | z      | $A_E$  | $A_W$ | dz    | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |   |   |
|--------|------------|--------|--------|-------|-------|--------|--------|------------------------------|---|---|
|        |            |        |        |       |       |        |        | $\Delta z$                   | E | W |
| +0     | 27.6 33 4  | 246 6  | 113 20 | -69   | -48 + | -4.0   | +14.0  | -                            |   |   |
| 1      | 27.6 32 40 | 247 32 | 111 55 | -69   | -45 + | -3.8   | +14.4  | -                            |   |   |
| 2      | 27.6 32 18 | 248 59 | 110 27 | -70   | -41 + | -3.5   | +14.8  | -                            |   |   |
| 3      | 27.5 31 58 | 250 29 | 108 57 | -71   | -37 + | -3.3   | +15.1  | -                            |   |   |
| 4      | 27.5 31 39 | 252 1  | 107 26 | -71   | -33 + | -3.0   | +15.5  | -                            |   |   |
| 5      | 27.5 31 21 | 253 35 | 105 52 | -72   | -29 + | -2.8   | +15.8  | -                            |   |   |
| 6      | 27.5 31 6  | 255 10 | 104 16 | -72   | -24 + | -2.5   | +16.1  | -                            |   |   |
| 7      | 27.5 30 51 | 256 47 | 102 39 | -73   | -20 + | -2.2   | +16.3  | -                            |   |   |
| 8      | 27.4 30 39 | 258 26 | 101 0  | -73   | -15 + | -2.0   | +16.5  | -                            |   |   |
| 9      | 27.4 30 28 | 260 6  | 99 20  | -73   | -10 + | -1.7   | +16.7  | -                            |   |   |
| 10     | 27.4 30 18 | 261 47 | 97 39  | -73   | -5 +  | -1.4   | +16.9  | -                            |   |   |
| 11     | 27.4 30 11 | 263 29 | 95 57  | -73   | 0     | -1.1   | +17.1  | -                            |   |   |
| 12     | 27.4 30 6  | 265 12 | 94 14  | -73   | +6 -  | -0.8   | +17.2  | -                            |   |   |
| 13     | 27.3 30 2  | 266 55 | 92 31  | -73   | +11 - | -0.5   | +17.2  | -                            |   |   |
| 14     | 27.3 30 0  | 268 38 | 90 47  | -73   | +16 - | -0.2   | +17.3  | -                            |   |   |
| 15     | 27.3 29 59 | 270 22 | 89 3   | -72   | +21 - | +0.1   | +17.3  | -                            |   |   |
| 16     | 27.3 30 1  | 272 6  | 87 19  | -72   | +27 - | +0.4   | +17.3  | -                            |   |   |
| 17     | 27.3 30 4  | 273 49 | 85 35  | -72   | +32 - | +0.7   | +17.2  | -                            |   |   |
| 18     | 27.2 30 10 | 275 32 | 83 53  | -71   | +37 - | +1.0   | +17.1  | -                            |   |   |
| 19     | 27.2 30 17 | 277 14 | 82 10  | -70   | +41 - | +1.3   | +17.0  | -                            |   |   |
| +20    | 27.2 30 25 | 278 56 | 80 28  | -69   | +46 - | +1.6   | +16.9  | -                            |   |   |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| 0      | m          | '          | '            | '            |
| +0     | +0.05      | +0.1       | -0.3         | +0.6         |
| 5      | 0.05       | +0.1       | 0.4          | 0.6          |
| 10     | 0.05       | 0.0        | 0.4          | 0.7          |
| 15     | 0.05       | 0.0        | 0.4          | 0.7          |
| +20    | +0.05      | -0.1       | -0.4         | +0.7         |

DATA REQUIRED FOR OBSERVATION.

|             | No.   | Star            | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|-------|-----------------|------|---------------------------|---------------------------|
|             |       |                 |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 14 | E 51  | $\iota$ Orionis | 2.9  | 5 33.0                    | -5 56                     |
|             | W 177 | $\beta$ Aquarii | 3.1  | 21 28.9                   | -5 48                     |

| $\phi$ | S          | z      | $A_E$ | $A_W$ | dz    | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |   |   |
|--------|------------|--------|-------|-------|-------|--------|--------|------------------------------|---|---|
|        |            |        |       |       |       |        |        | $\Delta z$                   | E | W |
| +0     | 31.0 61 18 | 276 47 | 83 24 | -74   | +5 -  | +1.2   | +5.4   | -                            |   |   |
| 1      | 31.0 61 25 | 277 19 | 82 51 | -74   | +7 -  | +1.3   | +5.4   | -                            |   |   |
| 2      | 31.0 61 33 | 277 51 | 82 19 | -74   | +8 -  | +1.4   | +5.4   | -                            |   |   |
| 3      | 31.0 61 41 | 278 23 | 81 47 | -74   | +10 - | +1.5   | +5.3   | -                            |   |   |
| 4      | 31.0 61 50 | 278 55 | 81 15 | -74   | +12 - | +1.5   | +5.3   | -                            |   |   |
| 5      | 31.0 62 0  | 279 27 | 80 43 | -74   | +13 - | +1.6   | +5.3   | -                            |   |   |
| 6      | 31.0 62 10 | 279 58 | 80 12 | -74   | +15 - | +1.7   | +5.2   | -                            |   |   |
| 7      | 31.0 62 21 | 280 29 | 79 41 | -73   | +17 - | +1.8   | +5.2   | -                            |   |   |
| 8      | 31.0 62 32 | 281 0  | 79 10 | -73   | +18 - | +1.9   | +5.1   | -                            |   |   |
| 9      | 31.0 62 43 | 281 31 | 78 40 | -73   | +20 - | +2.0   | +5.1   | -                            |   |   |
| 10     | 31.0 62 55 | 282 1  | 78 10 | -72   | +21 - | +2.1   | +5.0   | -                            |   |   |
| 11     | 31.1 63 8  | 282 31 | 77 40 | -72   | +23 - | +2.2   | +5.0   | -                            |   |   |
| 12     | 31.1 63 21 | 283 0  | 77 10 | -71   | +24 - | +2.2   | +4.9   | -                            |   |   |
| 13     | 31.1 63 35 | 283 30 | 76 41 | -71   | +26 - | +2.3   | +4.8   | -                            |   |   |
| 14     | 31.1 63 49 | 283 58 | 76 12 | -71   | +27 - | +2.4   | +4.8   | -                            |   |   |
| 15     | 31.1 64 4  | 284 27 | 75 44 | -70   | +29 - | +2.5   | +4.7   | -                            |   |   |
| 16     | 31.1 64 19 | 284 55 | 75 16 | -70   | +30 - | +2.6   | +4.7   | -                            |   |   |
| 17     | 31.1 64 34 | 285 23 | 74 48 | -69   | +31 - | +2.6   | +4.6   | -                            |   |   |
| 18     | 31.1 64 50 | 285 50 | 74 21 | -69   | +33 - | +2.7   | +4.5   | -                            |   |   |
| 19     | 31.1 65 7  | 286 17 | 73 54 | -68   | +34 - | +2.8   | +4.5   | -                            |   |   |
| +20    | 31.1 65 24 | 286 44 | 73 27 | -67   | +35 - | +2.9   | +4.4   | -                            |   |   |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| 0      | m          | '          | '            | '            |
| +0     | +0.05      | 0.0        | 0.0          | +0.3         |
| 5      | 0.05       | -0.1       | 0.0          | 0.3          |
| 10     | 0.05       | 0.1        | 0.0          | 0.3          |
| 15     | 0.05       | 0.1        | 0.0          | 0.3          |
| +20    | +0.05      | -0.1       | 0.0          | +0.3         |



TABLE II.

| Pair No. | E | No. | Star            | Mag. | $\alpha_{1950}$ |      | $\delta_{1950}$ |    |
|----------|---|-----|-----------------|------|-----------------|------|-----------------|----|
|          |   |     |                 |      | h               | m    | °               | '  |
| 15       | E | 38  | $\gamma$ Tauri  | 3.9  | 4               | 16.9 | +15             | 31 |
|          | W | 191 | $\alpha$ Pegasi | 2.6  | 23              | 2.3  | +14             | 56 |

| $\varphi$ | S      | z     | $A_E$  | $A_W$  | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |   |                 |   |
|-----------|--------|-------|--------|--------|-----|--------|--------|---------------------------------|---|-----------------|---|
|           |        |       |        |        |     |        |        | $\Delta z$                      | E | $\Delta A$<br>W |   |
| +0        | 42.0   | 42 18 | 246 36 | 112 30 | -69 | -33    | +      | -3.9                            | + | 10.1            | - |
| 1         | 40.0   | 41 55 | 247 37 | 111 29 | -70 | -31    | +      | -3.7                            | + | 10.3            | - |
| 2         | 39.9   | 41 33 | 248 39 | 110 26 | -70 | -29    | +      | -3.6                            | + | 10.5            | - |
| 3         | 39.9   | 41 13 | 249 43 | 109 23 | -71 | -26    | +      | -3.4                            | + | 10.7            | - |
| 4         | 39.9   | 40 53 | 250 48 | 108 18 | -71 | -24    | +      | -3.2                            | + | 10.9            | - |
| 5         | 39.8   | 40 34 | 251 54 | 107 11 | -71 | -21    | +      | -3.0                            | + | 11.1            | - |
| 6         | 39.8   | 40 16 | 253 2  | 106 4  | -72 | -18    | +      | -2.8                            | + | 11.3            | - |
| 7         | 39.8   | 40 0  | 254 10 | 104 55 | -72 | -15    | +      | -2.7                            | + | 11.5            | - |
| 8         | 39.7   | 39 45 | 255 20 | 103 46 | -72 | -12    | +      | -2.5                            | + | 11.6            | - |
| 9         | 39.7   | 39 30 | 256 30 | 102 35 | -72 | -9     | +      | -2.3                            | + | 11.8            | - |
| 10        | 39.7   | 39 17 | 257 41 | 101 24 | -72 | -6     | +      | -2.1                            | + | 12.0            | - |
| 11        | 39.6   | 39 6  | 258 53 | 100 12 | -72 | -3     | +      | -1.9                            | + | 12.1            | - |
| 12        | 39.6   | 38 55 | 260 6  | 98 59  | -72 | 0      |        | -1.6                            | + | 12.2            | - |
| 13        | 39.6   | 38 46 | 261 20 | 97 45  | -72 | +4     | -      | -1.4                            | + | 12.3            | - |
| 14        | 39.5   | 38 38 | 262 34 | 96 31  | -72 | +7     | -      | -1.2                            | + | 12.4            | - |
| 15        | 39.5   | 38 31 | 263 48 | 95 16  | -72 | +10    | -      | -1.0                            | + | 12.5            | - |
| 16        | 39.5   | 38 26 | 265 3  | 94 1   | -72 | +14    | -      | -0.8                            | + | 12.5            | - |
| 17        | 39.4   | 38 22 | 266 19 | 92 45  | -72 | +17    | -      | -0.6                            | + | 12.6            | - |
| 18        | 39.4   | 38 19 | 267 34 | 91 29  | -71 | +20    | -      | -0.3                            | + | 12.6            | - |
| 19        | 39.4   | 38 18 | 268 50 | 90 13  | -71 | +24    | -      | -0.1                            | + | 12.6            | - |
| +20       | I 39.3 | 38 18 | 270 6  | 88 57  | -70 | +27    | -      | +0.1                            | + | 12.7            | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| +0        | +0.05      | +0.1       | -0.2         | +0.5         |
| 5         | 0.05       | 0.1        | 0.2          | 0.5          |
| 10        | 0.05       | +0.1       | 0.2          | 0.5          |
| 15        | 0.05       | 0.0        | 0.3          | 0.5          |
| +20       | +0.05      | 0.0        | -0.2         | +0.5         |

DATA REQUIRED FOR OBSERVATION.

| Pair No. | E | No. | Star             | Mag. | $\alpha_{1950}$ |      | $\delta_{1950}$ |    |
|----------|---|-----|------------------|------|-----------------|------|-----------------|----|
|          |   |     |                  |      | h               | m    | °               | '  |
| 16       | E | 46  | $\gamma$ Orionis | 1.7  | 5               | 22.4 | +6              | 18 |
|          | W | 183 | $\theta$ Pegasi  | 3.7  | 22              | 7.7  | +5              | 57 |

| $\varphi$ | S      | z     | $A_E$  | $A_W$ | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |   |                 |   |
|-----------|--------|-------|--------|-------|-----|--------|--------|---------------------------------|---|-----------------|---|
|           |        |       |        |       |     |        |        | $\Delta z$                      | E | $\Delta A$<br>W |   |
| +0        | 45.1   | 55 12 | 262 19 | 97 15 | -74 | -7     | +      | -1.3                            | + | 6.9             | - |
| 1         | 45.1   | 55 5  | 263 0  | 96 34 | -75 | -5     | +      | -1.2                            | + | 6.9             | - |
| 2         | 45.1   | 54 58 | 263 42 | 95 52 | -75 | -3     | +      | -1.1                            | + | 7.0             | - |
| 3         | 45.1   | 54 52 | 264 24 | 95 10 | -75 | -1     | +      | -0.9                            | + | 7.0             | - |
| 4         | 45.1   | 54 47 | 265 6  | 94 28 | -75 | +1     | -      | -0.8                            | + | 7.0             | - |
| 5         | 45.0   | 54 42 | 265 48 | 93 45 | -75 | +3     | -      | -0.8                            | + | 7.1             | - |
| 6         | 45.0   | 54 38 | 266 31 | 93 3  | -75 | +5     | -      | -0.6                            | + | 7.1             | - |
| 7         | 45.0   | 54 35 | 267 13 | 92 20 | -74 | +7     | -      | -0.5                            | + | 7.1             | - |
| 8         | 45.0   | 54 33 | 267 56 | 91 38 | -74 | +9     | -      | -0.3                            | + | 7.1             | - |
| 9         | 45.0   | 54 31 | 268 38 | 90 55 | -74 | +11    | -      | -0.2                            | + | 7.1             | - |
| 10        | 45.0   | 54 31 | 269 21 | 90 12 | -74 | +13    | -      | -0.1                            | + | 7.1             | - |
| 11        | 44.9   | 54 30 | 270 4  | 89 29 | -74 | +15    | -      | +0.1                            | + | 7.1             | - |
| 12        | 44.9   | 54 31 | 270 47 | 88 47 | -73 | +17    | -      | +0.2                            | + | 7.1             | - |
| 13        | 44.9   | 54 33 | 271 29 | 88 4  | -73 | +19    | -      | +0.3                            | + | 7.1             | - |
| 14        | 44.9   | 54 35 | 272 12 | 87 21 | -73 | +21    | -      | +0.4                            | + | 7.1             | - |
| 15        | 44.9   | 54 38 | 272 55 | 86 38 | -72 | +22    | -      | +0.5                            | + | 7.1             | - |
| 16        | 44.9   | 54 41 | 273 37 | 85 56 | -72 | +24    | -      | +0.7                            | + | 7.1             | - |
| 17        | 44.8   | 54 46 | 274 19 | 85 13 | -71 | +26    | -      | +0.8                            | + | 7.0             | - |
| 18        | 44.8   | 54 51 | 275 1  | 84 31 | -71 | +28    | -      | +0.9                            | + | 7.0             | - |
| 19        | 44.8   | 54 57 | 276 43 | 83 49 | -70 | +30    | -      | +1.0                            | + | 7.0             | - |
| +20       | I 44.8 | 55 3  | 276 25 | 83 7  | -70 | +32    | -      | +1.2                            | + | 6.9             | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| +0        | +0.05      | 0.0        | -0.1         | +0.4         |
| 5         | 0.05       | 0.0        | 0.1          | 0.4          |
| 10        | 0.05       | 0.0        | 0.1          | 0.4          |
| 15        | 0.05       | 0.0        | 0.1          | 0.4          |
| +20       | +0.06      | 0.0        | -0.1         | +0.4         |



TABLE II.

|             | No.   | Star               | Mag. | $\alpha_{1950}$                  | $\delta_{1950}$ |
|-------------|-------|--------------------|------|----------------------------------|-----------------|
| Pair No. 17 | E 52  | $\epsilon$ Orionis | 1.8  | 5 <sup>h</sup> 33.7 <sup>m</sup> | -1 14           |
|             | W 180 | $\alpha$ Aquarii   | 3.2  | 22 3.2                           | -0 34           |

| $\varphi$ | S    | z     | $A_E$  | $A_W$ | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|------|-------|--------|-------|-----|--------|--------|---------------------------------|------------|---|
|           |      |       |        |       |     |        |        | $\Delta z$                      | $\Delta A$ |   |
|           |      |       |        |       |     |        |        | E                               | W          |   |
| + 0       | 43.5 | 56 56 | 271 28 | 89 20 | -75 | + 1    | -      | +0.2                            | + 6.5      | - |
| 1         | 48.5 | 56 58 | 272 7  | 88 41 | -75 | + 3    | -      | +0.3                            | + 6.5      | - |
| 2         | 48.5 | 57 0  | 272 46 | 88 2  | -75 | + 5    | -      | +0.4                            | + 6.5      | - |
| 3         | 48.5 | 57 3  | 273 25 | 87 23 | -75 | + 7    | -      | +0.5                            | + 6.5      | - |
| 4         | 48.6 | 57 6  | 274 4  | 86 44 | -75 | + 9    | -      | +0.6                            | + 6.5      | - |
| 5         | 48.6 | 57 10 | 274 43 | 86 6  | -75 | + 10   | -      | +0.8                            | + 6.4      | - |
| 6         | 48.6 | 57 15 | 275 21 | 85 27 | -74 | + 12   | -      | +0.9                            | + 6.4      | - |
| 7         | 48.7 | 57 21 | 276 0  | 84 49 | -74 | + 14   | -      | +1.0                            | + 6.4      | - |
| 8         | 48.7 | 57 27 | 276 38 | 84 11 | -74 | + 16   | -      | +1.1                            | + 6.4      | - |
| 9         | 48.7 | 57 34 | 277 16 | 83 33 | -74 | + 18   | -      | +1.2                            | + 6.3      | - |
| 10        | 48.7 | 57 41 | 277 54 | 82 55 | -73 | + 19   | -      | +1.3                            | + 6.3      | - |
| 11        | 48.8 | 57 49 | 278 31 | 82 18 | -73 | + 21   | -      | +1.4                            | + 6.2      | - |
| 12        | 48.8 | 57 58 | 279 9  | 81 41 | -73 | + 23   | -      | +1.5                            | + 6.2      | - |
| 13        | 48.8 | 58 8  | 279 46 | 81 4  | -72 | + 25   | -      | +1.6                            | + 6.2      | - |
| 14        | 48.9 | 58 18 | 280 23 | 80 27 | -72 | + 26   | -      | +1.7                            | + 6.1      | - |
| 15        | 48.9 | 58 28 | 280 59 | 79 51 | -71 | + 28   | -      | +1.8                            | + 6.1      | - |
| 16        | 48.9 | 58 40 | 281 35 | 79 15 | -71 | + 29   | -      | +1.9                            | + 6.0      | - |
| 17        | 49.0 | 58 52 | 282 11 | 78 39 | -70 | + 31   | -      | +2.0                            | + 5.9      | - |
| 18        | 49.0 | 59 4  | 282 46 | 78 4  | -70 | + 33   | -      | +2.1                            | + 5.9      | - |
| 19        | 49.0 | 59 17 | 283 21 | 77 30 | -69 | + 34   | -      | +2.2                            | + 5.8      | - |
| +20       | 49.1 | 59 31 | 283 56 | 76 55 | -68 | + 36   | -      | +2.3                            | + 5.7      | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | /          | /            | /            |
| + 0       | +0.05      | 0.0        | -0.1         | +0.4         |
| 5         | 0.05       | 0.0        | -0.1         | 0.4          |
| 10        | 0.05       | 0.0        | 0.0          | 0.3          |
| 15        | 0.05       | -0.1       | 0.0          | 0.3          |
| +20       | +0.06      | -0.1       | 0.0          | +0.3         |

|             | No.   | Star               | Mag. | $\alpha_{1950}$                  | $\delta_{1950}$ |
|-------------|-------|--------------------|------|----------------------------------|-----------------|
| Pair No. 18 | E 52  | $\epsilon$ Orionis | 1.8  | 5 <sup>h</sup> 33.7 <sup>m</sup> | -1 14           |
|             | W 184 | $\gamma$ Aquarii   | 4.0  | 22 19.1                          | -1 38           |

| $\varphi$ | S    | z     | $A_E$  | $A_W$ | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|------|-------|--------|-------|-----|--------|--------|---------------------------------|------------|---|
|           |      |       |        |       |     |        |        | $\Delta z$                      | $\Delta A$ |   |
|           |      |       |        |       |     |        |        | E                               | W          |   |
| + 0       | 56.4 | 54 58 | 271 30 | 88 0  | -75 | + 2    | -      | +0.3                            | + 7.0      | - |
| 1         | 56.3 | 55 0  | 272 12 | 87 18 | -75 | + 4    | -      | +0.4                            | + 7.0      | - |
| 2         | 56.3 | 55 3  | 272 54 | 86 36 | -75 | + 6    | -      | +0.5                            | + 7.0      | - |
| 3         | 56.3 | 55 7  | 273 36 | 85 54 | -75 | + 8    | -      | +0.7                            | + 7.0      | - |
| 4         | 56.3 | 55 11 | 274 17 | 85 12 | -75 | + 10   | -      | +0.8                            | + 6.9      | - |
| 5         | 56.3 | 55 16 | 274 59 | 84 31 | -74 | + 12   | -      | +0.9                            | + 6.9      | - |
| 6         | 56.3 | 55 22 | 275 40 | 83 49 | -74 | + 14   | -      | +1.0                            | + 6.9      | - |
| 7         | 56.2 | 55 28 | 276 21 | 83 8  | -74 | + 15   | -      | +1.2                            | + 6.8      | - |
| 8         | 56.2 | 55 36 | 277 2  | 82 27 | -74 | + 17   | -      | +1.3                            | + 6.8      | - |
| 9         | 56.2 | 55 44 | 277 43 | 81 47 | -73 | + 19   | -      | +1.4                            | + 6.8      | - |
| 10        | 56.2 | 55 52 | 278 23 | 81 6  | -73 | + 21   | -      | +1.5                            | + 6.7      | - |
| 11        | 56.2 | 56 2  | 279 3  | 80 26 | -73 | + 23   | -      | +1.6                            | + 6.6      | - |
| 12        | 56.1 | 56 12 | 279 43 | 79 46 | -72 | + 24   | -      | +1.7                            | + 6.6      | - |
| 13        | 56.1 | 56 22 | 280 22 | 79 7  | -72 | + 26   | -      | +1.8                            | + 6.5      | - |
| 14        | 56.1 | 56 34 | 281 1  | 78 28 | -71 | + 28   | -      | +2.0                            | + 6.5      | - |
| 15        | 56.1 | 56 46 | 281 40 | 77 49 | -71 | + 30   | -      | +2.1                            | + 6.4      | - |
| 16        | 56.1 | 56 59 | 282 18 | 77 11 | -70 | + 31   | -      | +2.2                            | + 6.3      | - |
| 17        | 56.1 | 57 12 | 282 56 | 76 33 | -70 | + 33   | -      | +2.3                            | + 6.3      | - |
| 18        | 56.0 | 57 26 | 283 33 | 75 55 | -69 | + 35   | -      | +2.4                            | + 6.2      | - |
| 19        | 56.0 | 57 41 | 284 10 | 75 18 | -69 | + 36   | -      | +2.5                            | + 6.1      | - |
| +20       | 56.0 | 57 56 | 284 46 | 74 42 | -68 | + 38   | -      | +2.6                            | + 6.0      | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | /          | /            | /            |
| + 0       | +0.05      | 0.0        | -0.1         | +0.4         |
| 5         | 0.05       | 0.0        | -0.1         | 0.4          |
| 10        | 0.05       | 0.0        | 0.0          | 0.4          |
| 15        | 0.05       | -0.1       | 0.0          | 0.4          |
| +20       | +0.06      | -0.1       | 0.0          | +0.4         |



TABLE II.

|             |   | No. | Star             | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|---|-----|------------------|------|---------------------------|---------------------------|
|             |   |     |                  |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 19 | E | 49  | $\delta$ Orionis | 2.5  | 5 29.5                    | -0 20                     |
|             | W | 185 | $\eta$ Aquarii   | 4.1  | 22 32.8                   | -0 23                     |

| $\varphi$ | S |     | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|---|-----|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------------|---|
|           | h | m   | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | $\Delta A$ | E |
| +0        | 2 | 1.1 | 52 | 43 | 270   | 25 | 89    | 32 | -75 | 0      |        | +0.1                            | +7.6       | - |
| 1         |   | 1.1 | 52 | 44 | 271   | 11 | 88    | 46 | -75 | +3     | -      | +0.2                            | +7.6       | - |
| 2         |   | 1.1 | 52 | 45 | 271   | 57 | 88    | 0  | -75 | +5     | -      | +0.3                            | +7.6       | - |
| 3         |   | 1.1 | 52 | 48 | 272   | 42 | 87    | 15 | -75 | +7     | -      | +0.5                            | +7.6       | - |
| 4         |   | 1.1 | 52 | 51 | 273   | 27 | 86    | 29 | -75 | +9     | -      | +0.6                            | +7.6       | - |
| 5         |   | 1.1 | 52 | 55 | 274   | 13 | 85    | 44 | -75 | +11    | -      | +0.7                            | +7.5       | - |
| 6         |   | 1.1 | 53 | 0  | 274   | 58 | 84    | 59 | -74 | +13    | -      | +0.9                            | +7.5       | - |
| 7         |   | 1.1 | 53 | 5  | 275   | 43 | 84    | 14 | -74 | +15    | -      | +1.0                            | +7.5       | - |
| 8         |   | 1.1 | 53 | 12 | 276   | 28 | 83    | 29 | -74 | +17    | -      | +1.1                            | +7.4       | - |
| 9         |   | 1.1 | 53 | 19 | 277   | 12 | 82    | 45 | -73 | +19    | -      | +1.3                            | +7.4       | - |
| 10        |   | 1.1 | 53 | 27 | 277   | 56 | 82    | 1  | -73 | +21    | -      | +1.4                            | +7.3       | - |
| 11        |   | 1.1 | 53 | 35 | 278   | 40 | 81    | 17 | -73 | +23    | -      | +1.5                            | +7.3       | - |
| 12        |   | 1.1 | 53 | 45 | 279   | 24 | 80    | 33 | -72 | +25    | -      | +1.6                            | +7.2       | - |
| 13        |   | 1.1 | 53 | 55 | 280   | 7  | 79    | 50 | -72 | +27    | -      | +1.8                            | +7.2       | - |
| 14        |   | 1.1 | 54 | 6  | 280   | 50 | 79    | 7  | -71 | +28    | -      | +1.9                            | +7.1       | - |
| 15        |   | 1.1 | 54 | 18 | 281   | 32 | 78    | 24 | -71 | +30    | -      | +2.0                            | +7.1       | - |
| 16        |   | 1.1 | 54 | 30 | 282   | 14 | 77    | 42 | -70 | +32    | -      | +2.1                            | +7.0       | - |
| 17        |   | 1.1 | 54 | 43 | 282   | 56 | 77    | 1  | -70 | +34    | -      | +2.2                            | +6.9       | - |
| 18        |   | 1.1 | 54 | 57 | 283   | 37 | 76    | 20 | -69 | +35    | -      | +2.4                            | +6.8       | - |
| 19        |   | 1.1 | 55 | 11 | 284   | 18 | 75    | 39 | -69 | +37    | -      | +2.5                            | +6.7       | - |
| +20       | 2 | 1.1 | 55 | 27 | 284   | 58 | 74    | 59 | -68 | +39    | -      | +2.6                            | +6.7       | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| +0        | +0.05      | 0.0        | -0.1         | -0.4         |
| 5         | 0.05       | 0.0        | 0.1          | 0.4          |
| 10        | 0.05       | 0.0        | -0.1         | 0.4          |
| 15        | 0.05       | -0.1       | 0.0          | 0.4          |
| +20       | +0.06      | -0.1       | 0.0          | -0.4         |

DATA REQUIRED FOR OBSERVATION.

|             |   | No. | Star               | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|---|-----|--------------------|------|---------------------------|---------------------------|
|             |   |     |                    |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 20 | E | 52  | $\epsilon$ Orionis | 1.8  | 5 33.7                    | -1 14                     |
|             | W | 185 | $\eta$ Aquarii     | 4.1  | 22 32.8                   | -0 23                     |

| $\varphi$ | S |     | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|---|-----|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------------|---|
|           | h | m   | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | $\Delta A$ | E |
| +0        | 2 | 3.3 | 53 | 14 | 271   | 33 | 89    | 32 | -75 | +1     | -      | +0.2                            | +7.5       | - |
| 1         |   | 3.3 | 53 | 16 | 272   | 17 | 88    | 47 | -75 | +3     | -      | +0.3                            | +7.5       | - |
| 2         |   | 3.3 | 53 | 18 | 273   | 2  | 88    | 3  | -75 | +5     | -      | +0.4                            | +7.4       | - |
| 3         |   | 3.4 | 53 | 21 | 273   | 47 | 87    | 18 | -75 | +7     | -      | +0.6                            | +7.4       | - |
| 4         |   | 3.4 | 53 | 25 | 274   | 31 | 86    | 34 | -75 | +9     | -      | +0.7                            | +7.4       | - |
| 5         |   | 3.4 | 53 | 29 | 275   | 16 | 85    | 49 | -75 | +11    | -      | +0.8                            | +7.4       | - |
| 6         |   | 3.5 | 53 | 35 | 276   | 0  | 85    | 5  | -74 | +13    | -      | +1.0                            | +7.4       | - |
| 7         |   | 3.5 | 53 | 41 | 276   | 44 | 84    | 21 | -74 | +15    | -      | +1.1                            | +7.3       | - |
| 8         |   | 3.6 | 53 | 48 | 277   | 28 | 83    | 38 | -74 | +17    | -      | +1.2                            | +7.3       | - |
| 9         |   | 3.6 | 53 | 55 | 278   | 11 | 82    | 54 | -73 | +19    | -      | +1.3                            | +7.2       | - |
| 10        |   | 3.6 | 54 | 4  | 278   | 54 | 82    | 11 | -73 | +21    | -      | +1.5                            | +7.2       | - |
| 11        |   | 3.7 | 54 | 13 | 279   | 37 | 81    | 28 | -73 | +23    | -      | +1.6                            | +7.1       | - |
| 12        |   | 3.7 | 54 | 23 | 280   | 20 | 80    | 46 | -72 | +25    | -      | +1.7                            | +7.1       | - |
| 13        |   | 3.8 | 54 | 33 | 281   | 2  | 80    | 4  | -72 | +27    | -      | +1.8                            | +7.0       | - |
| 14        |   | 3.8 | 54 | 44 | 281   | 44 | 79    | 22 | -71 | +29    | -      | +1.9                            | +7.0       | - |
| 15        |   | 3.8 | 54 | 56 | 282   | 26 | 78    | 41 | -71 | +30    | -      | +2.1                            | +6.9       | - |
| 16        |   | 3.9 | 55 | 9  | 283   | 7  | 78    | 0  | -70 | +32    | -      | +2.2                            | +6.8       | - |
| 17        |   | 3.9 | 55 | 22 | 283   | 48 | 77    | 20 | -70 | +34    | -      | +2.3                            | +6.8       | - |
| 18        |   | 4.0 | 55 | 36 | 284   | 28 | 76    | 40 | -69 | +36    | -      | +2.4                            | +6.7       | - |
| 19        |   | 4.0 | 55 | 51 | 285   | 8  | 76    | 1  | -69 | +37    | -      | +2.5                            | +6.6       | - |
| +20       | 2 | 4.0 | 56 | 7  | 285   | 47 | 75    | 22 | -68 | +39    | -      | +2.6                            | +6.5       | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| +0        | +0.05      | 0.0        | -0.1         | -0.4         |
| 5         | 0.05       | 0.0        | 0.0          | 0.4          |
| 10        | 0.05       | 0.0        | 0.0          | 0.4          |
| 15        | 0.05       | -0.1       | 0.0          | 0.4          |
| +20       | +0.06      | -0.1       | 0.0          | -0.4         |



TABLE II.

|             |   | No. | Star           | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|---|-----|----------------|------|---------------------------|---------------------------|
|             |   |     |                |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 21 | E | 47  | $\beta$ Tauri  | 1.8  | 5 23.1                    | +28 34                    |
|             | W | 190 | $\beta$ Pegasi | 2.6  | 23 1.3                    | +27 49                    |

| $\varphi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |      |   |     |   |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|---------------------------------|------|---|-----|---|
|           | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                      | E    | W |     |   |
| +0        | 2            | 13.0         | 54           | 9            | 233          | 51           | 125          | 8            | -61 | -      | 32     | +                               | -5.8 | + | 5.9 | - |
| 1         |              | 12.9         | 53           | 34           | 234          | 26           | 124          | 33           | -61 | -      | 31     | +                               | -5.7 | + | 6.0 | - |
| 2         |              | 12.9         | 53           | 0            | 235          | 3            | 123          | 56           | -62 | -      | 30     | +                               | -5.7 | + | 6.2 | - |
| 3         |              | 12.9         | 52           | 26           | 235          | 41           | 123          | 18           | -62 | -      | 29     | +                               | -5.6 | + | 6.4 | - |
| 4         |              | 12.8         | 51           | 53           | 236          | 20           | 122          | 39           | -63 | -      | 28     | +                               | -5.5 | + | 6.6 | - |
| 5         |              | 12.8         | 51           | 20           | 237          | 0            | 121          | 59           | -63 | -      | 26     | +                               | -5.4 | + | 6.7 | - |
| 6         |              | 12.8         | 50           | 48           | 237          | 41           | 121          | 18           | -63 | -      | 25     | +                               | -5.3 | + | 6.9 | - |
| 7         |              | 12.7         | 50           | 17           | 238          | 23           | 120          | 36           | -64 | -      | 24     | +                               | -5.2 | + | 7.1 | - |
| 8         |              | 12.7         | 49           | 46           | 239          | 6            | 119          | 53           | -64 | -      | 22     | +                               | -5.1 | + | 7.3 | - |
| 9         |              | 12.7         | 49           | 16           | 239          | 50           | 119          | 8            | -64 | -      | 21     | +                               | -5.0 | + | 7.5 | - |
| 10        |              | 12.6         | 48           | 47           | 240          | 35           | 118          | 23           | -65 | -      | 19     | +                               | -4.8 | + | 7.7 | - |
| 11        |              | 12.6         | 48           | 18           | 241          | 22           | 117          | 36           | -65 | -      | 17     | +                               | -4.7 | + | 7.8 | - |
| 12        |              | 12.5         | 47           | 50           | 242          | 9            | 116          | 48           | -65 | -      | 16     | +                               | -4.6 | + | 8.0 | - |
| 13        |              | 12.5         | 47           | 23           | 242          | 58           | 115          | 59           | -65 | -      | 14     | +                               | -4.5 | + | 8.2 | - |
| 14        |              | 12.5         | 46           | 57           | 243          | 48           | 115          | 9            | -65 | -      | 12     | +                               | -4.3 | + | 8.4 | - |
| 15        |              | 12.4         | 46           | 31           | 244          | 39           | 114          | 18           | -66 | -      | 10     | +                               | -4.2 | + | 8.6 | - |
| 16        |              | 12.4         | 46           | 6            | 245          | 31           | 113          | 26           | -66 | -      | 8      | +                               | -4.1 | + | 8.8 | - |
| 17        |              | 12.4         | 45           | 43           | 246          | 24           | 112          | 32           | -66 | -      | 6      | +                               | -3.9 | + | 9.0 | - |
| 18        |              | 12.3         | 45           | 19           | 247          | 18           | 111          | 37           | -66 | -      | 4      | +                               | -3.8 | + | 9.1 | - |
| 19        |              | 12.3         | 44           | 57           | 248          | 14           | 110          | 42           | -66 | -      | 2      | +                               | -3.6 | + | 9.3 | - |
| +20       | 2            | 12.2         | 44           | 36           | 249          | 10           | 109          | 45           | -66 | -      | 0      |                                 | -3.5 | + | 9.5 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| +0        | +0.05      | +0.2       | 0.0          | +0.4         |
| 5         | 0.05       | 0.2        | 0.0          | 0.4          |
| 10        | 0.05       | 0.1        | 0.0          | 0.4          |
| 15        | 0.05       | 0.1        | -0.1         | 0.4          |
| +20       | +0.06      | +0.1       | -0.1         | +0.5         |

DATA REQUIRED FOR OBSERVATION.

|             |   | No. | Star            | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|---|-----|-----------------|------|---------------------------|---------------------------|
|             |   |     |                 |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 22 | E | 48  | $\beta$ Leporis | 3.0  | 5 26.1                    | -20 48                    |
|             | W | 192 | 88 Aquarii      | 3.8  | 23 6.8                    | -21 27                    |

| $\varphi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |      |   |     |   |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|---------------------------------|------|---|-----|---|
|           | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                      | E    | W |     |   |
| +0        | 2            | 16.0         | 51           | 25           | 297          | 1            | 62           | 7            | -66 | +      | 28     | -                               | +4.6 | + | 7.1 | - |
| 1         |              | 16.0         | 51           | 53           | 297          | 43           | 61           | 25           | -66 | +      | 30     | -                               | +4.7 | + | 6.9 | - |
| 2         |              | 15.9         | 52           | 21           | 298          | 24           | 60           | 44           | -66 | +      | 31     | -                               | +4.8 | + | 6.8 | - |
| 3         |              | 15.9         | 52           | 51           | 299          | 4            | 60           | 4            | -65 | +      | 33     | -                               | +4.9 | + | 6.6 | - |
| 4         |              | 15.9         | 53           | 21           | 299          | 43           | 59           | 25           | -65 | +      | 34     | -                               | +5.0 | + | 6.4 | - |
| 5         |              | 15.8         | 53           | 51           | 300          | 21           | 58           | 47           | -64 | +      | 35     | -                               | +5.1 | + | 6.3 | - |
| 6         |              | 15.8         | 54           | 22           | 300          | 58           | 58           | 9            | -64 | +      | 37     | -                               | +5.2 | + | 6.1 | - |
| 7         |              | 15.8         | 54           | 53           | 301          | 34           | 57           | 33           | -63 | +      | 38     | -                               | +5.3 | + | 6.0 | - |
| 8         |              | 15.7         | 55           | 26           | 302          | 9            | 56           | 58           | -62 | +      | 39     | -                               | +5.4 | + | 5.8 | - |
| 9         |              | 15.7         | 55           | 58           | 302          | 44           | 56           | 23           | -62 | +      | 40     | -                               | +5.5 | + | 5.6 | - |
| 10        |              | 15.7         | 56           | 31           | 303          | 17           | 55           | 50           | -61 | +      | 41     | -                               | +5.6 | + | 5.5 | - |
| 11        |              | 15.6         | 57           | 5            | 303          | 50           | 55           | 17           | -61 | +      | 42     | -                               | +5.6 | + | 5.3 | - |
| 12        |              | 15.6         | 57           | 39           | 304          | 21           | 54           | 45           | -60 | +      | 43     | -                               | +5.7 | + | 5.2 | - |
| 13        |              | 15.6         | 58           | 13           | 304          | 52           | 54           | 14           | -59 | +      | 44     | -                               | +5.8 | + | 5.0 | - |
| 14        |              | 15.5         | 58           | 48           | 305          | 22           | 53           | 44           | -59 | +      | 45     | -                               | +5.9 | + | 4.9 | - |
| 15        |              | 15.5         | 59           | 23           | 305          | 51           | 53           | 15           | -58 | +      | 45     | -                               | +5.9 | + | 4.8 | - |
| 16        |              | 15.5         | 59           | 59           | 306          | 19           | 52           | 47           | -57 | +      | 46     | -                               | +6.0 | + | 4.6 | - |
| 17        |              | 15.4         | 60           | 35           | 306          | 46           | 52           | 19           | -57 | +      | 47     | -                               | +6.1 | + | 4.5 | - |
| 18        |              | 15.4         | 61           | 12           | 307          | 12           | 51           | 53           | -56 | +      | 48     | -                               | +6.1 | + | 4.3 | - |
| 19        |              | 15.4         | 61           | 49           | 307          | 38           | 51           | 27           | -55 | +      | 49     | -                               | +6.2 | + | 4.2 | - |
| +20       | 2            | 15.3         | 62           | 26           | 308          | 2            | 51           | 2            | -55 | +      | 49     | -                               | +6.2 | + | 4.0 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| +0        | +0.05      | -0.1       | 0.0          | +0.4         |
| 5         | 0.05       | 0.1        | 0.0          | 0.4          |
| 10        | 0.05       | 0.2        | 0.0          | 0.3          |
| 15        | 0.05       | 0.2        | +0.1         | 0.3          |
| +20       | +0.06      | -0.2       | +0.1         | +0.3         |



TABLE II.

|             | No.   | Star                | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|-------|---------------------|------|---------------------------|---------------------------|
|             |       |                     |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 23 | E 62  | $\epsilon$ Geminor. | 3.2  | 6 40.9                    | +25 11                    |
|             | W 182 | $\iota$ Pegasi      | 4.0  | 22 4.7                    | +25 6                     |

| $\varphi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |       |   |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|---------------------------------|------------|-------|---|
|           | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                      | $\Delta A$ | E     | W |
| + 0       | 2            | 22.8         | 67           | 38           | 242          | 37           | 117          | 18           | -67 | -      | 15     | +                               | -4.6       | + 3.7 | - |
| 1         |              | 22.8         | 67           | 11           | 242          | 59           | 116          | 56           | -67 | -      | 13     | +                               | -4.5       | + 3.8 | - |
| 2         |              | 22.8         | 66           | 44           | 243          | 22           | 116          | 33           | -67 | -      | 12     | +                               | -4.5       | + 3.8 | - |
| 3         |              | 22.8         | 65           | 17           | 243          | 45           | 116          | 10           | -67 | -      | 11     | +                               | -4.4       | + 3.9 | - |
| 4         |              | 22.8         | 65           | 51           | 244          | 9            | 115          | 46           | -68 | -      | 10     | +                               | -4.4       | + 4.0 | - |
| 5         |              | 22.8         | 65           | 25           | 244          | 33           | 115          | 21           | -68 | -      | 9      | +                               | -4.3       | + 4.1 | - |
| 6         |              | 22.8         | 64           | 59           | 244          | 58           | 114          | 56           | -68 | -      | 7      | +                               | -4.2       | + 4.2 | - |
| 7         |              | 22.8         | 64           | 34           | 245          | 24           | 114          | 31           | -68 | -      | 6      | +                               | -4.2       | + 4.3 | - |
| 8         |              | 22.8         | 64           | 9            | 245          | 50           | 114          | 4            | -68 | -      | 5      | +                               | -4.1       | + 4.4 | - |
| 9         |              | 22.8         | 63           | 45           | 246          | 17           | 113          | 38           | -68 | -      | 3      | +                               | -4.0       | + 4.5 | - |
| 10        |              | 22.8         | 63           | 21           | 246          | 45           | 113          | 10           | -68 | -      | 2      | +                               | -3.9       | + 4.6 | - |
| 11        |              | 22.8         | 62           | 58           | 247          | 12           | 112          | 42           | -68 | -      | 1      | +                               | -3.9       | + 4.7 | - |
| 12        |              | 22.8         | 62           | 35           | 247          | 41           | 112          | 14           | -68 | +      | 1      | -                               | -3.8       | + 4.8 | - |
| 13        |              | 22.8         | 62           | 12           | 248          | 10           | 111          | 45           | -68 | +      | 2      | -                               | -3.7       | + 4.9 | - |
| 14        |              | 22.8         | 61           | 50           | 248          | 40           | 111          | 15           | -68 | +      | 4      | -                               | -3.6       | + 5.0 | - |
| 15        |              | 22.8         | 61           | 29           | 249          | 10           | 110          | 45           | -68 | +      | 5      | -                               | -3.5       | + 5.1 | - |
| 16        |              | 22.8         | 61           | 8            | 249          | 40           | 110          | 14           | -68 | +      | 7      | -                               | -3.5       | + 5.2 | - |
| 17        |              | 22.8         | 60           | 47           | 250          | 12           | 109          | 43           | -68 | +      | 8      | -                               | -3.4       | + 5.3 | - |
| 18        |              | 22.8         | 60           | 27           | 250          | 44           | 109          | 11           | -67 | +      | 10     | -                               | -3.3       | + 5.4 | - |
| 19        |              | 22.7         | 60           | 8            | 251          | 16           | 108          | 38           | -67 | +      | 11     | -                               | -3.2       | + 5.4 | - |
| +20       | 2            | 22.7         | 59           | 49           | 251          | 49           | 108          | 5            | -67 | +      | 13     | -                               | -3.1       | + 5.5 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | "/           | /'           |
| + 0       | +0.05      | +0.1       | +0.1         | +0.3         |
| 5         | 0.05       | 0.1        | 0.1          | 0.3          |
| 10        | 0.05       | 0.1        | 0.1          | 0.3          |
| 15        | 0.05       | 0.1        | 0.1          | 0.3          |
| +20       | +0.06      | +0.1       | +0.1         | +0.4         |

DATA REQUIRED FOR OBSERVATION.

|             | No.   | Star             | Mag.    | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|-------|------------------|---------|---------------------------|---------------------------|
|             |       |                  |         | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 24 | E 58  | $\eta$ Geminor.  | 3.3-4.2 | 6 11.9                    | +22 31                    |
|             | W 188 | $\lambda$ Pegasi | 4.1     | 22 44.1                   | +23 18                    |

| $\varphi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |       |   |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|---------------------------------|------------|-------|---|
|           | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                      | $\Delta A$ | E     | W |
| + 0       | 2            | 27.6         | 59           | 32           | 243          | 37           | 117          | 19           | -67 | -      | 20     | +                               | -4.5       | + 5.3 | - |
| 1         |              | 27.6         | 59           | 5            | 244          | 9            | 116          | 48           | -67 | -      | 19     | +                               | -4.4       | + 5.4 | - |
| 2         |              | 27.6         | 58           | 36           | 244          | 41           | 116          | 15           | -68 | -      | 18     | +                               | -4.3       | + 5.5 | - |
| 3         |              | 27.7         | 58           | 13           | 245          | 15           | 115          | 42           | -68 | -      | 16     | +                               | -4.3       | + 5.6 | - |
| 4         |              | 27.7         | 57           | 47           | 245          | 49           | 115          | 8            | -68 | -      | 15     | +                               | -4.2       | + 5.7 | - |
| 5         |              | 27.7         | 57           | 23           | 246          | 24           | 114          | 33           | -68 | -      | 13     | +                               | -4.1       | + 5.9 | - |
| 6         |              | 27.7         | 56           | 58           | 246          | 59           | 113          | 58           | -68 | -      | 12     | +                               | -4.0       | + 6.0 | - |
| 7         |              | 27.8         | 56           | 35           | 247          | 35           | 113          | 22           | -69 | -      | 10     | +                               | -3.9       | + 6.1 | - |
| 8         |              | 27.8         | 56           | 12           | 248          | 12           | 112          | 45           | -69 | -      | 9      | +                               | -3.8       | + 6.2 | - |
| 9         |              | 27.9         | 55           | 49           | 248          | 50           | 112          | 7            | -69 | -      | 7      | +                               | -3.7       | + 6.3 | - |
| 10        |              | 27.9         | 55           | 27           | 249          | 28           | 111          | 29           | -69 | -      | 6      | +                               | -3.6       | + 6.4 | - |
| 11        |              | 27.9         | 55           | 6            | 250          | 7            | 110          | 51           | -69 | -      | 4      | +                               | -3.5       | + 6.6 | - |
| 12        |              | 28.0         | 54           | 46           | 250          | 47           | 110          | 11           | -69 | -      | 2      | +                               | -3.4       | + 6.7 | - |
| 13        |              | 28.0         | 54           | 26           | 251          | 27           | 109          | 31           | -69 | -      | 1      | +                               | -3.3       | + 6.8 | - |
| 14        |              | 28.0         | 54           | 6            | 252          | 8            | 108          | 50           | -69 | +      | 1      | -                               | -3.2       | + 6.9 | - |
| 15        |              | 28.1         | 53           | 48           | 252          | 50           | 108          | 9            | -69 | +      | 3      | -                               | -3.0       | + 7.0 | - |
| 16        |              | 28.1         | 53           | 30           | 253          | 32           | 107          | 27           | -69 | +      | 5      | -                               | -2.9       | + 7.1 | - |
| 17        |              | 28.1         | 53           | 13           | 254          | 15           | 106          | 44           | -69 | +      | 7      | -                               | -2.8       | + 7.2 | - |
| 18        |              | 28.2         | 52           | 56           | 254          | 58           | 106          | 1            | -69 | +      | 9      | -                               | -2.7       | + 7.3 | - |
| 19        |              | 28.2         | 52           | 41           | 255          | 43           | 105          | 17           | -69 | +      | 10     | -                               | -2.5       | + 7.4 | - |
| +20       | 2            | 28.2         | 52           | 26           | 256          | 27           | 104          | 33           | -68 | +      | 12     | -                               | -2.4       | + 7.5 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | "/           | /'           |
| + 0       | +0.05      | +0.1       | +0.1         | +0.3         |
| 5         | 0.05       | 0.1        | 0.0          | 0.4          |
| 10        | 0.05       | 0.1        | 0.0          | 0.4          |
| 15        | 0.06       | 0.1        | 0.0          | 0.4          |
| +20       | +0.06      | +0.1       | 0.0          | +0.4         |



TABLE II.

|             | No.   | Star             | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|-------|------------------|------|---------------------------|---------------------------|
|             |       |                  |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 25 | E 59  | $\mu$ Geminor.   | 3.2  | 6 19.9                    | +22 32                    |
|             | W 188 | $\lambda$ Pegasi | 4.1  | 22 44.1                   | +23 18                    |

| $\phi$ | S      | z     | $A_E$  | $A_W$  | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |   |   |
|--------|--------|-------|--------|--------|-----|--------|--------|------------------------------|---|---|
|        |        |       |        |        |     |        |        | $\Delta z$                   | E | W |
| + 0    | 2 31.6 | 60 26 | 243 51 | 117 3  | -67 | - 20 + | -45    | + 5.1 -                      |   |   |
| 1      | 31.6   | 59 59 | 244 22 | 116 33 | -67 | - 18 + | -44    | + 5.2 -                      |   |   |
| 2      | 31.7   | 59 33 | 244 54 | 116 1  | -68 | - 17 + | -43    | + 5.3 -                      |   |   |
| 3      | 31.7   | 59 7  | 245 26 | 115 29 | -68 | - 16 + | -42    | + 5.4 -                      |   |   |
| 4      | 31.7   | 58 42 | 245 59 | 114 56 | -68 | - 14 + | -41    | + 5.5 -                      |   |   |
| 5      | 31.8   | 58 18 | 246 32 | 114 23 | -68 | - 13 + | -41    | + 5.7 -                      |   |   |
| 6      | 31.8   | 57 54 | 247 6  | 113 48 | -69 | - 11 + | -40    | + 5.8 -                      |   |   |
| 7      | 31.8   | 57 30 | 247 41 | 113 13 | -69 | - 10 + | -39    | + 5.9 -                      |   |   |
| 8      | 31.9   | 57 7  | 248 17 | 112 38 | -69 | - 8 +  | -38    | + 6.0 -                      |   |   |
| 9      | 31.9   | 56 45 | 248 53 | 112 2  | -69 | - 7 +  | -37    | + 6.1 -                      |   |   |
| 10     | 31.9   | 56 23 | 249 30 | 111 25 | -69 | - 5 +  | -36    | + 6.2 -                      |   |   |
| 11     | 32.0   | 56 2  | 250 8  | 110 47 | -69 | - 3 +  | -35    | + 6.3 -                      |   |   |
| 12     | 32.0   | 55 41 | 250 46 | 110 9  | -69 | - 2 +  | -34    | + 6.4 -                      |   |   |
| 13     | 32.0   | 55 21 | 251 25 | 109 31 | -69 | 0      | -33    | + 6.6 -                      |   |   |
| 14     | 32.1   | 55 2  | 252 5  | 108 51 | -69 | + 2 -  | -32    | + 6.7 -                      |   |   |
| 15     | 32.1   | 54 44 | 252 45 | 108 11 | -69 | + 4 -  | -30    | + 6.8 -                      |   |   |
| 16     | 32.1   | 54 26 | 253 26 | 107 31 | -69 | + 5 -  | -29    | + 6.9 -                      |   |   |
| 17     | 32.2   | 54 8  | 254 7  | 106 50 | -69 | + 7 -  | -28    | + 7.0 -                      |   |   |
| 18     | 32.2   | 53 52 | 254 49 | 106 8  | -69 | + 9 -  | -27    | + 7.1 -                      |   |   |
| 19     | 32.2   | 53 36 | 255 32 | 105 26 | -69 | + 11 - | -26    | + 7.2 -                      |   |   |
| +20    | 2 32.3 | 53 21 | 256 15 | 104 43 | -68 | + 13 - | -25    | + 7.3 -                      |   |   |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| °      | m          | '          | '            | '            |
| + 0    | +0.05      | +0.1       | +0.1         | +0.4         |
| 5      | 0.05       | 0.1        | +0.1         | 0.4          |
| 10     | 0.05       | 0.1        | 0.0          | 0.4          |
| 15     | 0.06       | 0.1        | 0.0          | 0.4          |
| +20    | +0.06      | +0.1       | 0.0          | +0.4         |

DATA REQUIRED FOR OBSERVATION.

|             | No.   | Star             | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|-------|------------------|------|---------------------------|---------------------------|
|             |       |                  |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 26 | E 46  | $\gamma$ Orionis | 1.7  | 5 22.4                    | +6 18                     |
|             | W 196 | $\omega$ Piscium | 4.0  | 23 56.7                   | +6 35                     |

| $\phi$ | S      | z     | $A_E$  | $A_W$ | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |   |   |
|--------|--------|-------|--------|-------|-----|--------|--------|------------------------------|---|---|
|        |        |       |        |       |     |        |        | $\Delta z$                   | E | W |
| + 0    | 2 39.5 | 41 45 | 260 31 | 99 55 | -74 | - 15 + | -1.7   | + 11.1 -                     |   |   |
| 1      | 39.5   | 41 35 | 261 37 | 98 49 | -74 | - 12 + | -1.5   | + 11.1 -                     |   |   |
| 2      | 39.6   | 41 27 | 262 44 | 97 42 | -74 | - 9 +  | -1.3   | + 11.2 -                     |   |   |
| 3      | 39.6   | 41 20 | 263 52 | 96 34 | -75 | - 6 +  | -1.1   | + 11.3 -                     |   |   |
| 4      | 39.6   | 41 14 | 265 0  | 95 26 | -75 | - 3 +  | -0.9   | + 11.4 -                     |   |   |
| 5      | 39.6   | 41 9  | 266 8  | 94 18 | -75 | 0      | -0.7   | + 11.4 -                     |   |   |
| 6      | 39.6   | 41 5  | 267 17 | 93 9  | -75 | + 4 -  | -0.5   | + 11.5 -                     |   |   |
| 7      | 39.6   | 41 3  | 268 26 | 92 0  | -75 | + 7 -  | -0.3   | + 11.5 -                     |   |   |
| 8      | 39.7   | 41 1  | 269 35 | 90 52 | -74 | + 10 - | -0.1   | + 11.5 -                     |   |   |
| 9      | 39.7   | 41 1  | 270 44 | 89 43 | -74 | + 13 - | +0.1   | + 11.5 -                     |   |   |
| 10     | 39.7   | 41 3  | 271 53 | 88 34 | -74 | + 16 - | +0.3   | + 11.5 -                     |   |   |
| 11     | 39.7   | 41 5  | 273 1  | 87 25 | -74 | + 19 - | +0.5   | + 11.5 -                     |   |   |
| 12     | 39.7   | 41 8  | 274 10 | 86 16 | -73 | + 22 - | +0.7   | + 11.4 -                     |   |   |
| 13     | 39.7   | 41 13 | 275 18 | 85 8  | -73 | + 25 - | +0.9   | + 11.4 -                     |   |   |
| 14     | 39.7   | 41 19 | 276 26 | 84 0  | -72 | + 28 - | +1.1   | + 11.3 -                     |   |   |
| 15     | 39.8   | 41 26 | 277 34 | 82 53 | -72 | + 30 - | +1.3   | + 11.3 -                     |   |   |
| 16     | 39.8   | 41 34 | 278 42 | 81 45 | -71 | + 33 - | +1.5   | + 11.2 -                     |   |   |
| 17     | 39.8   | 41 44 | 279 48 | 80 39 | -71 | + 36 - | +1.7   | + 11.1 -                     |   |   |
| 18     | 39.8   | 41 54 | 280 54 | 79 33 | -70 | + 39 - | +1.9   | + 11.0 -                     |   |   |
| 19     | 39.8   | 42 6  | 282 0  | 78 28 | -69 | + 41 - | +2.0   | + 10.8 -                     |   |   |
| +20    | 2 39.8 | 42 19 | 283 4  | 77 23 | -69 | + 44 - | +2.2   | + 10.7 -                     |   |   |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| °      | m          | '          | '            | '            |
| + 0    | +0.05      | 0.0        | -0.1         | +0.5         |
| 5      | 0.05       | 0.0        | 0.1          | 0.5          |
| 10     | 0.05       | 0.0        | 0.1          | 0.5          |
| 15     | 0.06       | 0.0        | 0.1          | 0.5          |
| +20    | +0.06      | -0.1       | -0.1         | +0.5         |



TABLE II.

|             | No.  | Star            | Mag. | $\alpha_{1950}$ | $\delta_{1950}$ |
|-------------|------|-----------------|------|-----------------|-----------------|
| Pair No. 27 | E 44 | $\beta$ Orionis | 0.3  | 5 12.1          | -8 15           |
|             | W 3  | $\iota$ Ceti    | 3.8  | 0 16.9          | -9 6            |

| $\varphi$ | S |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |       |   |
|-----------|---|------|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|-------|---|
|           | h | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | E     | W |
| +0        | 2 | 44.2 | 38 | 23 | 283   | 22 | 75    | 14 | -73 | +24    | -      | +2.4                            | +12.3 | - |
| 1         |   | 44.1 | 38 | 38 | 284   | 35 | 74    | 1  | -72 | +27    | -      | +2.6                            | +12.1 | - |
| 2         |   | 44.1 | 38 | 54 | 285   | 47 | 72    | 49 | -72 | +30    | -      | +2.8                            | +11.9 | - |
| 3         |   | 44.0 | 39 | 12 | 286   | 57 | 71    | 36 | -71 | +33    | -      | +3.0                            | +11.7 | - |
| 4         |   | 44.0 | 39 | 31 | 288   | 7  | 70    | 29 | -71 | +36    | -      | +3.2                            | +11.5 | - |
| 5         |   | 43.9 | 39 | 51 | 289   | 15 | 69    | 21 | -70 | +38    | -      | +3.4                            | +11.3 | - |
| 6         |   | 43.9 | 40 | 12 | 290   | 22 | 68    | 14 | -70 | +41    | -      | +3.6                            | +11.0 | - |
| 7         |   | 43.8 | 40 | 34 | 291   | 27 | 67    | 8  | -69 | +43    | -      | +3.8                            | +10.8 | - |
| 8         |   | 43.8 | 40 | 57 | 292   | 31 | 66    | 4  | -68 | +46    | -      | +3.9                            | +10.6 | - |
| 9         |   | 43.7 | 41 | 21 | 293   | 34 | 65    | 1  | -67 | +48    | -      | +4.1                            | +10.4 | - |
| 10        |   | 43.7 | 41 | 46 | 294   | 35 | 63    | 59 | -66 | +50    | -      | +4.3                            | +10.1 | - |
| 11        |   | 43.6 | 42 | 12 | 295   | 35 | 62    | 59 | -66 | +52    | -      | +4.4                            | +9.9  | - |
| 12        |   | 43.6 | 42 | 39 | 296   | 34 | 62    | 0  | -65 | +53    | -      | +4.6                            | +9.6  | - |
| 13        |   | 43.5 | 43 | 7  | 297   | 31 | 61    | 3  | -64 | +55    | -      | +4.7                            | +9.4  | - |
| 14        |   | 43.5 | 43 | 36 | 298   | 26 | 60    | 7  | -63 | +57    | -      | +4.9                            | +9.1  | - |
| 15        |   | 43.4 | 44 | 6  | 299   | 20 | 59    | 13 | -62 | +58    | -      | +5.0                            | +8.9  | - |
| 16        |   | 43.4 | 44 | 36 | 300   | 13 | 58    | 19 | -62 | +59    | -      | +5.1                            | +8.7  | - |
| 17        |   | 43.3 | 45 | 8  | 301   | 4  | 57    | 28 | -61 | +61    | -      | +5.3                            | +8.4  | - |
| 18        |   | 43.3 | 45 | 40 | 301   | 54 | 56    | 37 | -60 | +62    | -      | +5.4                            | +8.2  | - |
| 19        |   | 43.2 | 46 | 12 | 302   | 43 | 55    | 48 | -59 | +63    | -      | +5.5                            | +8.0  | - |
| +20       | 2 | 43.2 | 46 | 46 | 303   | 30 | 55    | 1  | -58 | +64    | -      | +5.6                            | +7.7  | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| +0        | +0.05      | -0.1       | -0.1         | +0.5         |
| 5         | 0.05       | 0.1        | -0.1         | 0.5          |
| 10        | 0.05       | 0.1        | 0.0          | 0.5          |
| 15        | 0.06       | 0.1        | 0.0          | 0.5          |
| +20       | +0.06      | -0.1       | 0.0          | +0.4         |

DATA REQUIRED FOR OBSERVATION.

|             | No.   | Star             | Mag.    | $\alpha_{1950}$ | $\delta_{1950}$ |
|-------------|-------|------------------|---------|-----------------|-----------------|
| Pair No. 28 | E 56  | $\alpha$ Orionis | 0.5-1.1 | 5 52.5          | +7 24           |
|             | W 196 | $\omega$ Piscium | 4.0     | 23 56.7         | +6 35           |

| $\varphi$ | S |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |       |   |
|-----------|---|------|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|-------|---|
|           | h | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | E     | W |
| +0        | 2 | 54.8 | 45 | 31 | 259   | 36 | 99    | 15 | -74 | -13    | +      | -1.7                            | +9.7  | - |
| 1         |   | 54.8 | 45 | 21 | 260   | 34 | 98    | 16 | -74 | -10    | +      | -1.5                            | +9.8  | - |
| 2         |   | 54.7 | 45 | 12 | 261   | 33 | 97    | 18 | -74 | -8     | +      | -1.4                            | +9.8  | - |
| 3         |   | 54.7 | 45 | 5  | 262   | 32 | 96    | 18 | -75 | -5     | +      | -1.2                            | +9.9  | - |
| 4         |   | 54.6 | 44 | 58 | 263   | 32 | 95    | 19 | -75 | -3     | +      | -1.0                            | +10.0 | - |
| 5         |   | 54.6 | 44 | 52 | 264   | 31 | 94    | 19 | -75 | 0      |        | -0.9                            | +10.0 | - |
| 6         |   | 54.6 | 44 | 48 | 265   | 32 | 93    | 19 | -75 | +3     | -      | -0.7                            | +10.0 | - |
| 7         |   | 54.5 | 44 | 44 | 266   | 32 | 92    | 18 | -74 | +5     | -      | -0.5                            | +10.1 | - |
| 8         |   | 54.5 | 44 | 42 | 267   | 32 | 91    | 18 | -74 | +8     | -      | -0.3                            | +10.1 | - |
| 9         |   | 54.4 | 44 | 40 | 268   | 33 | 90    | 17 | -74 | +11    | -      | -0.2                            | +10.1 | - |
| 10        |   | 54.4 | 44 | 40 | 269   | 34 | 89    | 16 | -74 | +13    | -      | 0.0                             | +10.1 | - |
| 11        |   | 54.4 | 44 | 41 | 270   | 34 | 88    | 15 | -74 | +16    | -      | +0.2                            | +10.1 | - |
| 12        |   | 54.3 | 44 | 42 | 271   | 35 | 87    | 14 | -73 | +19    | -      | +0.4                            | +10.1 | - |
| 13        |   | 54.3 | 44 | 45 | 272   | 35 | 86    | 14 | -73 | +21    | -      | +0.6                            | +10.0 | - |
| 14        |   | 54.2 | 44 | 49 | 273   | 35 | 85    | 13 | -72 | +24    | -      | +0.7                            | +10.0 | - |
| 15        |   | 54.2 | 44 | 54 | 274   | 35 | 84    | 13 | -72 | +26    | -      | +0.9                            | +10.0 | - |
| 16        |   | 54.1 | 45 | 0  | 275   | 35 | 83    | 13 | -72 | +29    | -      | +1.1                            | +9.9  | - |
| 17        |   | 54.1 | 45 | 7  | 276   | 34 | 82    | 14 | -71 | +31    | -      | +1.3                            | +9.8  | - |
| 18        |   | 54.0 | 45 | 15 | 277   | 33 | 81    | 14 | -70 | +34    | -      | +1.4                            | +9.8  | - |
| 19        |   | 54.0 | 45 | 24 | 278   | 31 | 80    | 15 | -70 | +36    | -      | +1.6                            | +9.7  | - |
| +20       | 2 | 54.0 | 45 | 34 | 279   | 29 | 79    | 17 | -69 | +38    | -      | +1.8                            | +9.6  | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| +0        | +0.05      | 0.0        | 0.0          | +0.5         |
| 5         | 0.05       | 0.0        | 0.0          | 0.5          |
| 10        | 0.05       | 0.0        | 0.0          | 0.5          |
| 15        | 0.06       | 0.0        | 0.0          | 0.5          |
| +20       | +0.06      | 0.0        | 0.0          | +0.5         |



TABLE II.

|             | No.   | Star              | Mag. | $\alpha_{1950}$ | $\delta_{1950}$ |
|-------------|-------|-------------------|------|-----------------|-----------------|
| Pair No. 29 | E 68  | $\delta$ Geminor. | 3.5  | 7 17.1          | +22 5           |
|             | W 183 | $\lambda$ Pegasi  | 4.1  | 22 44.1         | +23 18          |

| $\varphi$ | S |     | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |      |   |     |   |
|-----------|---|-----|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------|---|-----|---|
|           | h | m   | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | E    | W |     |   |
| +0        | 3 | 0.1 | 66 | 50 | 245   | 52 | 115   | 29 | -58 | -      | 14     | +                               | -4.2 | + | 3.9 | - |
| 1         |   | 0.2 | 66 | 25 | 246   | 16 | 115   | 6  | -68 | -      | 13     | +                               | -4.1 | + | 4.0 | - |
| 2         |   | 0.2 | 66 | 0  | 246   | 40 | 114   | 42 | -69 | -      | 11     | +                               | -4.1 | + | 4.1 | - |
| 3         |   | 0.3 | 65 | 36 | 247   | 5  | 114   | 17 | -69 | -      | 10     | +                               | -4.0 | + | 4.2 | - |
| 4         |   | 0.3 | 65 | 12 | 247   | 30 | 113   | 52 | -69 | -      | 9      | +                               | -3.9 | + | 4.3 | - |
| 5         |   | 0.4 | 64 | 49 | 247   | 56 | 113   | 26 | -69 | -      | 7      | +                               | -3.9 | + | 4.4 | - |
| 6         |   | 0.4 | 64 | 26 | 248   | 22 | 113   | 0  | -69 | -      | 6      | +                               | -3.8 | + | 4.4 | - |
| 7         |   | 0.5 | 64 | 3  | 248   | 49 | 112   | 33 | -69 | -      | 5      | +                               | -3.7 | + | 4.5 | - |
| 8         |   | 0.5 | 63 | 41 | 249   | 17 | 112   | 6  | -69 | -      | 3      | +                               | -3.7 | + | 4.6 | - |
| 9         |   | 0.6 | 63 | 19 | 249   | 45 | 111   | 38 | -69 | -      | 2      | +                               | -3.6 | + | 4.7 | - |
| 10        |   | 0.6 | 62 | 58 | 250   | 13 | 111   | 10 | -69 | -      | 1      | +                               | -3.5 | + | 4.8 | - |
| 11        |   | 0.7 | 62 | 37 | 250   | 42 | 110   | 41 | -69 | +      | 1      | -                               | -3.4 | + | 4.9 | - |
| 12        |   | 0.7 | 62 | 17 | 251   | 12 | 110   | 12 | -69 | +      | 2      | -                               | -3.3 | + | 5.0 | - |
| 13        |   | 0.8 | 61 | 57 | 251   | 42 | 109   | 42 | -69 | +      | 4      | -                               | -3.3 | + | 5.1 | - |
| 14        |   | 0.8 | 61 | 38 | 252   | 13 | 109   | 12 | -69 | +      | 5      | -                               | -3.2 | + | 5.2 | - |
| 15        |   | 0.9 | 61 | 19 | 252   | 44 | 108   | 41 | -69 | +      | 7      | -                               | -3.1 | + | 5.2 | - |
| 16        |   | 0.9 | 61 | 1  | 253   | 15 | 108   | 10 | -69 | +      | 9      | -                               | -3.0 | + | 5.3 | - |
| 17        |   | 1.0 | 60 | 43 | 253   | 48 | 107   | 38 | -69 | +      | 10     | -                               | -2.9 | + | 5.4 | - |
| 18        |   | 1.0 | 60 | 26 | 254   | 20 | 107   | 6  | -68 | +      | 12     | -                               | -2.8 | + | 5.5 | - |
| 19        |   | 1.1 | 60 | 9  | 254   | 54 | 106   | 33 | -68 | +      | 13     | -                               | -2.7 | + | 5.6 | - |
| +20       | 3 | 1.1 | 59 | 53 | 255   | 27 | 106   | 0  | -68 | +      | 15     | -                               | -2.6 | + | 5.7 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| +0        | +0.05      | +0.1       | +0.2         | +0.3         |
| 5         | 0.05       | 0.1        | 0.1          | 0.4          |
| 10        | 0.05       | 0.1        | 0.1          | 0.4          |
| 15        | 0.06       | 0.1        | 0.1          | 0.4          |
| +20       | +0.06      | +0.1       | +0.1         | +0.4         |

DATA REQUIRED FOR OBSERVATION.

|             | No.  | Star             | Mag. | $\alpha_{1950}$ | $\delta_{1950}$ |
|-------------|------|------------------|------|-----------------|-----------------|
| Pair No. 30 | E 50 | $\alpha$ Leporis | 2.7  | 5 30.5          | -17 51          |
|             | W 5  | $\beta$ Ceti     | 2.2  | 0 41.1          | -18 16          |

| $\varphi$ | S |     | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |      |   |      |   |
|-----------|---|-----|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------|---|------|---|
|           | h | m   | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | E    | W |      |   |
| +0        | 3 | 5.4 | 40 | 26 | 298   | 13 | 61    | 7  | -66 | +      | 43     | -                               | +4.8 | + | 10.3 | - |
| 1         |   | 5.4 | 40 | 55 | 299   | 14 | 60    | 5  | -65 | +      | 45     | -                               | +5.0 | + | 10.0 | - |
| 2         |   | 5.4 | 41 | 25 | 300   | 13 | 59    | 6  | -64 | +      | 47     | -                               | +5.1 | + | 9.8  | - |
| 3         |   | 5.4 | 41 | 56 | 301   | 11 | 58    | 8  | -64 | +      | 49     | -                               | +5.2 | + | 9.5  | - |
| 4         |   | 5.3 | 42 | 28 | 302   | 7  | 57    | 12 | -63 | +      | 51     | -                               | +5.4 | + | 9.2  | - |
| 5         |   | 5.3 | 43 | 0  | 303   | 1  | 56    | 18 | -62 | +      | 52     | -                               | +5.5 | + | 9.0  | - |
| 6         |   | 5.3 | 43 | 31 | 303   | 54 | 55    | 25 | -61 | +      | 53     | -                               | +5.6 | + | 8.7  | - |
| 7         |   | 5.3 | 44 | 8  | 304   | 46 | 54    | 33 | -61 | +      | 55     | -                               | +5.8 | + | 8.4  | - |
| 8         |   | 5.3 | 44 | 43 | 305   | 35 | 53    | 43 | -60 | +      | 56     | -                               | +5.9 | + | 8.2  | - |
| 9         |   | 5.2 | 45 | 18 | 306   | 24 | 52    | 55 | -59 | +      | 57     | -                               | +6.0 | + | 7.9  | - |
| 10        |   | 5.2 | 45 | 54 | 307   | 11 | 52    | 8  | -58 | +      | 58     | -                               | +6.1 | + | 7.7  | - |
| 11        |   | 5.2 | 46 | 31 | 307   | 56 | 51    | 23 | -57 | +      | 59     | -                               | +6.2 | + | 7.4  | - |
| 12        |   | 5.2 | 47 | 9  | 308   | 40 | 50    | 39 | -57 | +      | 60     | -                               | +6.3 | + | 7.2  | - |
| 13        |   | 5.1 | 47 | 47 | 309   | 22 | 49    | 56 | -56 | +      | 60     | -                               | +6.4 | + | 7.0  | - |
| 14        |   | 5.1 | 48 | 25 | 310   | 3  | 49    | 15 | -55 | +      | 61     | -                               | +6.5 | + | 6.7  | - |
| 15        |   | 5.1 | 49 | 4  | 310   | 43 | 48    | 35 | -54 | +      | 62     | -                               | +6.6 | + | 6.5  | - |
| 16        |   | 5.0 | 49 | 44 | 311   | 21 | 47    | 56 | -53 | +      | 62     | -                               | +6.7 | + | 6.3  | - |
| 17        |   | 5.0 | 50 | 24 | 311   | 59 | 47    | 19 | -53 | +      | 63     | -                               | +6.7 | + | 6.1  | - |
| 18        |   | 5.0 | 51 | 5  | 312   | 35 | 46    | 42 | -52 | +      | 63     | -                               | +6.8 | + | 5.9  | - |
| 19        |   | 5.0 | 51 | 46 | 313   | 9  | 46    | 7  | -51 | +      | 64     | -                               | +6.9 | + | 5.7  | - |
| +20       | 3 | 4.9 | 52 | 28 | 313   | 43 | 45    | 33 | -50 | +      | 64     | -                               | +7.0 | + | 5.5  | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| +0        | +0.05      | -0.1       | 0.0          | +0.5         |
| 5         | 0.05       | 0.1        | 0.0          | 0.5          |
| 10        | 0.05       | 0.1        | +0.1         | 0.4          |
| 15        | 0.06       | 0.2        | 0.1          | 0.4          |
| +20       | +0.06      | -0.2       | +0.1         | +0.4         |



TABLE II.

|             | No.   | Star             | Mag. | $\alpha_{1950}$                | $\delta_{1950}$   |
|-------------|-------|------------------|------|--------------------------------|-------------------|
| Pair No. 31 | E 69  | $\iota$ Geminor. | 3.9  | $7^{\text{h}} 22.6^{\text{m}}$ | $+27^{\circ} 54'$ |
|             | W 190 | $\beta$ Peg si   | 2.6  | 23 1.3                         | $+27^{\circ} 49'$ |

| $\varphi$ | S |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |       |   |
|-----------|---|------|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------------|-------|---|
|           | h | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | $\Delta A$ | E     | W |
| +0        | 3 | 12.0 | 66 | 35 | 239   | 21 | 120   | 34 | -64 | -      | 17     | +                               | -5.1       | + 3.7 | - |
| 1         |   | 12.0 | 66 | 4  | 239   | 43 | 120   | 11 | -65 | -      | 16     | +                               | -5.0       | + 3.8 | - |
| 2         |   | 12.0 | 65 | 34 | 240   | 7  | 119   | 48 | -65 | -      | 15     | +                               | -5.0       | + 3.9 | - |
| 3         |   | 12.0 | 65 | 5  |       | 31 | 119   | 24 | -65 | -      | 14     | +                               | -4.9       | + 4.1 | - |
| 4         |   | 12.0 | 64 | 35 | 240   | 55 | 118   | 59 | -65 | -      | 12     | +                               | -4.9       | + 4.2 | - |
| 5         |   | 12.0 | 64 | 7  | 241   | 20 | 118   | 34 | -66 | -      | 11     | +                               | -4.8       | + 4.3 | - |
| 6         |   | 12.0 | 63 | 38 | 241   | 46 | 118   | 8  | -66 | -      | 10     | +                               | -4.7       | + 4.4 | - |
| 7         |   | 12.0 | 63 | 10 | 242   | 13 | 117   | 41 | -66 | -      | 9      | +                               | -4.7       | + 4.5 | - |
| 8         |   | 12.0 | 62 | 42 | 242   | 40 | 117   | 14 | -66 | -      | 8      | +                               | -4.6       | + 4.6 | - |
| 9         |   | 12.0 | 62 | 15 | 243   | 8  | 116   | 46 | -66 | -      | 6      | +                               | -4.5       | + 4.7 | - |
| 10        |   | 12.0 | 61 | 48 | 243   | 36 | 116   | 18 | -66 | -      | 5      | +                               | -4.4       | + 4.8 | - |
| 11        |   | 12.0 | 61 | 22 | 244   | 5  | 115   | 49 | -66 | -      | 4      | +                               | -4.4       | + 4.9 | - |
| 12        |   | 12.0 | 60 | 56 | 244   | 35 | 115   | 19 | -66 | -      | 2      | +                               | -4.3       | + 5.0 | - |
| 13        |   | 12.0 | 60 | 30 | 245   | 6  | 114   | 48 | -66 | -      | 1      | +                               | -4.2       | + 5.1 | - |
| 14        |   | 12.0 | 60 | 5  | 245   | 37 | 114   | 17 | -66 | +      | 1      | -                               | -4.1       | + 5.2 | - |
| 15        |   | 12.0 | 59 | 41 | 246   | 9  | 113   | 45 | -66 | +      | 2      | -                               | -4.0       | + 5.4 | - |
| 16        |   | 12.0 | 59 | 17 | 246   | 41 | 113   | 13 | -66 | +      | 4      | -                               | -4.0       | + 5.5 | - |
| 17        |   | 12.0 | 58 | 53 | 247   | 14 | 112   | 40 | -66 | +      | 5      | -                               | -3.9       | + 5.6 | - |
| 18        |   | 12.0 | 58 | 30 | 247   | 48 | 112   | 6  | -66 | +      | 6      | -                               | -3.8       | + 5.7 | - |
| 19        |   | 12.0 | 58 | 8  | 248   | 22 | 111   | 32 | -66 | +      | 8      | -                               | -3.7       | + 5.8 | - |
| +20       | 3 | 12.0 | 57 | 46 | 248   | 57 | 110   | 57 | -66 | +      | 9      | -                               | -3.6       | + 5.9 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| +0        | +0.05      | +0.1       | +0.2         | +0.3         |
| 5         | 0.05       | 0.1        | 0.2          | 0.4          |
| 10        | 0.05       | 0.1        | 0.1          | 0.4          |
| 15        | 0.06       | 0.1        | 0.1          | 0.4          |
| +20       | +0.06      | +0.1       | +0.1         | +0.4         |

DATA REQUIRED FOR OBSERVATION.

|             | No.   | Star             | Mag. | $\alpha_{1950}$                | $\delta_{1950}$   |
|-------------|-------|------------------|------|--------------------------------|-------------------|
| Pair No. 32 | E 72  | $\beta$ Geminor. | 1.2  | $7^{\text{h}} 42.3^{\text{m}}$ | $+28^{\circ} 9'$  |
|             | W 190 | $\beta$ Pegasi   | 2.6  | 23 1.3                         | $+27^{\circ} 49'$ |

| $\varphi$ | S |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |       |   |
|-----------|---|------|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------------|-------|---|
|           | h | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | $\Delta A$ | E     | W |
| +0        | 3 | 22.0 | 68 | 44 | 239   | 35 | 120   | 3  | -65 | -      | 15     | +                               | -5.0       | + 3.4 | - |
| 1         |   | 22.0 | 68 | 14 | 239   | 56 | 119   | 42 | -65 | -      | 14     | +                               | -5.0       | + 3.5 | - |
| 2         |   | 21.9 | 67 | 44 | 240   | 17 | 119   | 21 | -65 | -      | 13     | +                               | -4.9       | + 3.6 | - |
| 3         |   | 21.9 | 67 | 14 | 240   | 38 | 118   | 59 | -66 | -      | 12     | +                               | -4.9       | + 3.7 | - |
| 4         |   | 21.9 | 66 | 45 | 241   | 1  | 118   | 37 | -66 | -      | 11     | +                               | -4.8       | + 3.8 | - |
| 5         |   | 21.9 | 66 | 17 | 241   | 23 | 118   | 14 | -66 | -      | 9      | +                               | -4.8       | + 3.9 | - |
| 6         |   | 21.9 | 65 | 48 | 241   | 47 | 117   | 51 | -66 | -      | 8      | +                               | -4.7       | + 4.0 | - |
| 7         |   | 21.9 | 65 | 20 | 242   | 11 | 117   | 27 | -66 | -      | 7      | +                               | -4.6       | + 4.1 | - |
| 8         |   | 21.9 | 64 | 52 | 242   | 36 | 117   | 2  | -66 | -      | 6      | +                               | -4.6       | + 4.2 | - |
| 9         |   | 21.8 | 64 | 25 | 243   | 1  | 116   | 36 | -66 | -      | 5      | +                               | -4.5       | + 4.3 | - |
| 10        |   | 21.8 | 63 | 58 | 243   | 27 | 116   | 10 | -66 | -      | 3      | +                               | -4.5       | + 4.4 | - |
| 11        |   | 21.8 | 63 | 32 | 243   | 54 | 115   | 44 | -66 | -      | 2      | +                               | -4.4       | + 4.5 | - |
| 12        |   | 21.8 | 63 | 6  | 244   | 21 | 115   | 17 | -66 | -      | 1      | +                               | -4.3       | + 4.6 | - |
| 13        |   | 21.8 | 62 | 40 | 244   | 48 | 114   | 49 | -66 | +      | 1      | -                               | -4.2       | + 4.7 | - |
| 14        |   | 21.8 | 62 | 15 | 245   | 17 | 114   | 20 | -66 | +      | 2      | -                               | -4.2       | + 4.8 | - |
| 15        |   | 21.8 | 61 | 50 | 245   | 46 | 113   | 51 | -66 | +      | 3      | -                               | -4.1       | + 4.9 | - |
| 16        |   | 21.8 | 61 | 26 | 246   | 15 | 113   | 21 | -66 | +      | 5      | -                               | -4.0       | + 5.0 | - |
| 17        |   | 21.7 | 61 | 3  | 246   | 46 | 112   | 51 | -66 | +      | 6      | -                               | -3.9       | + 5.1 | - |
| 18        |   | 21.7 | 60 | 39 | 247   | 16 | 112   | 20 | -66 | +      | 8      | -                               | -3.8       | + 5.2 | - |
| 19        |   | 21.7 | 60 | 17 | 247   | 48 | 111   | 49 | -66 | +      | 9      | -                               | -3.7       | + 5.3 | - |
| +20       | 3 | 21.7 | 59 | 54 | 248   | 20 | 111   | 17 | -66 | +      | 10     | -                               | -3.7       | + 5.4 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| +0        | +0.05      | +0.1       | +0.2         | +0.3         |
| 5         | 0.05       | 0.1        | 0.2          | 0.3          |
| 10        | 0.05       | 0.1        | 0.2          | 0.4          |
| 15        | 0.06       | 0.1        | 0.2          | 0.4          |
| +20       | +0.06      | +0.1       | +0.2         | +0.4         |



TABLE II

Pair No. 33  
 E 55  $\kappa$  Orionis 2.2  $\alpha_{1950}$  5 45.4  $\delta_{1950}$  -9 41  
 W 17  $\eta$  Ceti 3.6 1 6.1 -10 27

| $\phi$ | S |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |            |   |
|--------|---|------|----|----|-------|----|-------|----|-----|--------|--------|------------------------------|------------|---|
|        | h | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                   | $\Delta A$ | E |
| +0     | 3 | 25.3 | 36 | 45 | 286   | 19 | 72    | 21 | -72 | +30    | -      | +2.9                         | +12.8      | - |
| 1      |   | 25.3 | 37 | 4  | 287   | 35 | 71    | 5  | -71 | +34    | -      | +3.1                         | +12.6      | - |
| 2      |   | 25.3 | 37 | 23 | 288   | 50 | 69    | 50 | -71 | +37    | -      | +3.3                         | +12.3      | - |
| 3      |   | 25.2 | 37 | 44 | 290   | 3  | 68    | 37 | -70 | +40    | -      | +3.5                         | +12.1      | - |
| 4      |   | 25.2 | 38 | 5  | 291   | 15 | 67    | 25 | -69 | +42    | -      | +3.7                         | +11.8      | - |
| 5      |   | 25.1 | 38 | 28 | 292   | 25 | 66    | 15 | -69 | +45    | -      | +3.9                         | +11.6      | - |
| 6      |   | 25.1 | 38 | 52 | 293   | 33 | 65    | 6  | -68 | +47    | -      | +4.1                         | +11.3      | - |
| 7      |   | 25.0 | 39 | 18 | 294   | 40 | 63    | 59 | -67 | +50    | -      | +4.3                         | +11.0      | - |
| 8      |   | 25.0 | 39 | 44 | 295   | 46 | 62    | 54 | -66 | +52    | -      | +4.4                         | +10.8      | - |
| 9      |   | 24.9 | 40 | 11 | 296   | 49 | 61    | 50 | -66 | +54    | -      | +4.6                         | +10.5      | - |
| 10     |   | 24.9 | 40 | 39 | 297   | 52 | 60    | 48 | -65 | +56    | -      | +4.8                         | +10.2      | - |
| 11     |   | 24.8 | 41 | 8  | 298   | 52 | 59    | 47 | -64 | +57    | -      | +4.9                         | +9.9       | - |
| 12     |   | 24.8 | 41 | 38 | 299   | 51 | 58    | 48 | -63 | +59    | -      | +5.1                         | +9.7       | - |
| 13     |   | 24.7 | 42 | 9  | 300   | 48 | 57    | 50 | -62 | +60    | -      | +5.2                         | +9.4       | - |
| 14     |   | 24.7 | 42 | 41 | 301   | 44 | 56    | 54 | -61 | +62    | -      | +5.4                         | +9.1       | - |
| 15     |   | 24.6 | 43 | 14 | 302   | 38 | 56    | 0  | -60 | +63    | -      | +5.5                         | +8.9       | - |
| 16     |   | 24.6 | 43 | 47 | 303   | 30 | 55    | 7  | -59 | +64    | -      | +5.6                         | +8.6       | - |
| 17     |   | 24.5 | 44 | 21 | 304   | 21 | 54    | 16 | -58 | +65    | -      | +5.7                         | +8.3       | - |
| 18     |   | 24.5 | 44 | 56 | 305   | 10 | 53    | 26 | -57 | +66    | -      | +5.9                         | +8.1       | - |
| 19     |   | 24.4 | 45 | 31 | 305   | 58 | 52    | 38 | -56 | +67    | -      | +6.0                         | +7.8       | - |
| +20    | 3 | 24.4 | 46 | 7  | 306   | 44 | 51    | 51 | -55 | +68    | -      | +6.1                         | +7.6       | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| 0      | m          | '          | '            | '            |
| +0     | +0.05      | -0.1       | 0.0          | +0.5         |
| 5      | 0.05       | 0.1        | 0.0          | 0.5          |
| 10     | 0.05       | 0.1        | 0.0          | 0.5          |
| 15     | 0.06       | 0.1        | +0.1         | 0.5          |
| +20    | +0.06      | -0.1       | +0.1         | +0.4         |

DATA REQUIRED FOR OBSERVATION.

Pair No. 34  
 E 55  $\kappa$  Orionis 2.2  $\alpha_{1950}$  5 45.4  $\delta_{1950}$  -9 41  
 W 9  $\theta$  Ceti 3.8 1 21.5 -8 26

| $\phi$ | S |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |            |   |
|--------|---|------|----|----|-------|----|-------|----|-----|--------|--------|------------------------------|------------|---|
|        | h | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                   | $\Delta A$ | E |
| +0     | 3 | 34.1 | 34 | 40 | 287   | 13 | 75    | 4  | -72 | +31    | -      | +2.8                         | +14.0      | - |
| 1      |   | 34.1 | 34 | 53 | 288   | 36 | 73    | 42 | -72 | +34    | -      | +3.0                         | +13.7      | - |
| 2      |   | 34.2 | 35 | 16 | 289   | 57 | 72    | 20 | -71 | +37    | -      | +3.2                         | +13.4      | - |
| 3      |   | 34.3 | 35 | 36 | 291   | 16 | 71    | 1  | -70 | +40    | -      | +3.4                         | +13.1      | - |
| 4      |   | 34.4 | 35 | 57 | 292   | 34 | 69    | 43 | -70 | +44    | -      | +3.7                         | +12.8      | - |
| 5      |   | 34.5 | 36 | 20 | 293   | 50 | 68    | 27 | -69 | +47    | -      | +3.9                         | +12.5      | - |
| 6      |   | 34.5 | 36 | 44 | 295   | 5  | 67    | 13 | -68 | +49    | -      | +4.1                         | +12.3      | - |
| 7      |   | 34.6 | 37 | 9  | 296   | 18 | 66    | 1  | -67 | +51    | -      | +4.2                         | +12.0      | - |
| 8      |   | 34.7 | 37 | 35 | 297   | 28 | 64    | 50 | -66 | +54    | -      | +4.4                         | +11.7      | - |
| 9      |   | 34.8 | 38 | 2  | 298   | 38 | 63    | 41 | -65 | +56    | -      | +4.6                         | +11.4      | - |
| 10     |   | 34.9 | 38 | 30 | 299   | 45 | 62    | 34 | -64 | +59    | -      | +4.8                         | +11.1      | - |
| 11     |   | 35.0 | 38 | 59 | 300   | 51 | 61    | 29 | -64 | +60    | -      | +5.0                         | +10.8      | - |
| 12     |   | 35.0 | 39 | 29 | 301   | 54 | 60    | 26 | -63 | +62    | -      | +5.1                         | +10.5      | - |
| 13     |   | 35.1 | 40 | 0  | 302   | 56 | 59    | 25 | -62 | +63    | -      | +5.3                         | +10.2      | - |
| 14     |   | 35.2 | 40 | 32 | 303   | 56 | 58    | 25 | -61 | +65    | -      | +5.4                         | +9.9       | - |
| 15     |   | 35.3 | 41 | 5  | 304   | 55 | 57    | 27 | -60 | +67    | -      | +5.6                         | +9.6       | - |
| 16     |   | 35.4 | 41 | 39 | 305   | 52 | 56    | 31 | -59 | +68    | -      | +5.7                         | +9.3       | - |
| 17     |   | 35.5 | 42 | 14 | 306   | 47 | 55    | 37 | -58 | +69    | -      | +5.8                         | +9.0       | - |
| 18     |   | 35.6 | 42 | 49 | 307   | 40 | 54    | 44 | -57 | +70    | -      | +5.9                         | +8.8       | - |
| 19     |   | 35.6 | 43 | 25 | 308   | 32 | 53    | 54 | -56 | +71    | -      | +6.1                         | +8.5       | - |
| +20    | 3 | 35.7 | 44 | 2  | 309   | 22 | 53    | 4  | -55 | +72    | -      | +6.2                         | +8.2       | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| 0      | m          | '          | '            | '            |
| +0     | +0.05      | -0.1       | 0.0          | +0.5         |
| 5      | 0.05       | 0.1        | 0.0          | 0.5          |
| 10     | 0.05       | 0.1        | +0.1         | 0.5          |
| 15     | 0.06       | 0.1        | 0.1          | 0.5          |
| +20    | +0.06      | -0.1       | +0.1         | +0.4         |



TABLE II.

|             | No.  | Star             | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|------|------------------|------|---------------------------|---------------------------|
|             |      |                  |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 35 | E 69 | $\zeta$ Geminor. | 3.9  | 7 22.6                    | +27 54                    |
|             | W 1  | $\alpha$ Androm. | 2.2  | 0 5.8                     | +28 49                    |

| $\varphi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|---------------------------------|------------|---|
|           | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                      | $\Delta A$ | E |
| +0        | 3            | 43.5         | 59           | 53           | 237          | 16           | 123          | 52           | -63 | -25    | +      | -5.5                            | +4.9       | - |
| 1         |              | 43.6         | 59           | 20           | 237          | 45           | 123          | 22           | -63 | -24    | +      | -5.4                            | +5.0       | - |
| 2         |              | 43.6         | 58           | 48           | 238          | 15           | 122          | 52           | -63 | -22    | +      | -5.3                            | +5.1       | - |
| 3         |              | 43.6         | 58           | 16           | 238          | 46           | 122          | 21           | -64 | -21    | +      | -5.3                            | +5.3       | - |
| 4         |              | 43.7         | 57           | 44           | 239          | 18           | 121          | 49           | -64 | -20    | +      | -5.2                            | +5.4       | - |
| 5         |              | 43.7         | 57           | 13           | 239          | 51           | 121          | 16           | -64 | -19    | +      | -5.1                            | +5.5       | - |
| 6         |              | 43.8         | 56           | 43           | 240          | 25           | 120          | 43           | -64 | -17    | +      | -5.0                            | +5.7       | - |
| 7         |              | 43.8         | 56           | 13           | 241          | 0            | 120          | 8            | -65 | -16    | +      | -4.9                            | +5.8       | - |
| 8         |              | 43.8         | 55           | 44           | 241          | 35           | 119          | 33           | -65 | -15    | +      | -4.8                            | +6.0       | - |
| 9         |              | 43.9         | 55           | 15           | 242          | 11           | 118          | 57           | -65 | -13    | +      | -4.8                            | +6.1       | - |
| 10        |              | 43.9         | 54           | 47           | 242          | 48           | 118          | 20           | -65 | -12    | +      | -4.7                            | +6.3       | - |
| 11        |              | 43.9         | 54           | 19           | 243          | 26           | 117          | 42           | -65 | -10    | +      | -4.6                            | +6.4       | - |
| 12        |              | 44.0         | 53           | 52           | 244          | 5            | 117          | 4            | -66 | -9     | +      | -4.5                            | +6.6       | - |
| 13        |              | 44.0         | 53           | 26           | 244          | 45           | 116          | 24           | -66 | -7     | +      | -4.4                            | +6.7       | - |
| 14        |              | 44.1         | 53           | 0            | 245          | 26           | 115          | 44           | -66 | -6     | +      | -4.3                            | +6.9       | - |
| 15        |              | 44.1         | 52           | 35           | 246          | 7            | 115          | 3            | -66 | -4     | +      | -4.1                            | +7.0       | - |
| 16        |              | 44.2         | 52           | 10           | 246          | 50           | 114          | 21           | -66 | -2     | +      | -4.0                            | +7.1       | - |
| 17        |              | 44.2         | 51           | 46           | 247          | 33           | 113          | 38           | -66 | -1     | +      | -3.9                            | +7.3       | - |
| 18        |              | 44.2         | 51           | 23           | 248          | 17           | 112          | 54           | -66 | +1     | -      | -3.8                            | +7.4       | - |
| 19        |              | 44.3         | 51           | 1            | 249          | 2            | 112          | 9            | -66 | +3     | -      | -3.7                            | +7.6       | - |
| +20       | 3            | 44.3         | 50           | 39           | 249          | 48           | 111          | 24           | -66 | +5     | -      | -3.6                            | +7.7       | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| +0        | +0.05      | +0.1       | +0.2         | +0.4         |
| 5         | 0.05       | 0.1        | 0.2          | 0.4          |
| 10        | 0.05       | 0.1        | 0.2          | 0.4          |
| 15        | 0.06       | 0.1        | 0.2          | 0.4          |
| +20       | +0.06      | +0.1       | +0.1         | +0.4         |

DATA REQUIRED FOR OBSERVATION.

|             | No.  | Star             | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|------|------------------|------|---------------------------|---------------------------|
|             |      |                  |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 36 | E 55 | $\kappa$ Orionis | 2.2  | 5 45.4                    | -9 41                     |
|             | W 12 | $\zeta$ Ceti     | 3.9  | 1 49.0                    | -10 35                    |

| $\varphi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|---------------------------------|------------|---|
|           | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                      | $\Delta A$ | E |
| +0        | 3            | 46.6         | 31           | 41           | 288          | 40           | 69           | 31           | -71 | +42    | -      | +3.4                            | +15.3      | - |
| 1         |              | 46.6         | 32           | 2            | 290          | 10           | 68           | 1            | -70 | +46    | -      | +3.6                            | +14.9      | - |
| 2         |              | 46.5         | 32           | 24           | 291          | 40           | 66           | 32           | -69 | +50    | -      | +3.8                            | +14.5      | - |
| 3         |              | 46.4         | 32           | 48           | 293          | 5            | 65           | 6            | -68 | +53    | -      | +4.1                            | +14.2      | - |
| 4         |              | 46.4         | 33           | 13           | 294          | 29           | 63           | 42           | -68 | +56    | -      | +4.3                            | +13.8      | - |
| 5         |              | 46.3         | 33           | 39           | 295          | 50           | 62           | 21           | -67 | +59    | -      | +4.5                            | +13.4      | - |
| 6         |              | 46.3         | 34           | 7            | 297          | 9            | 61           | 1            | -66 | +62    | -      | +4.7                            | +13.0      | - |
| 7         |              | 46.2         | 34           | 35           | 298          | 26           | 59           | 44           | -65 | +64    | -      | +4.9                            | +12.6      | - |
| 8         |              | 46.1         | 35           | 5            | 299          | 41           | 58           | 29           | -64 | +66    | -      | +5.1                            | +12.2      | - |
| 9         |              | 46.1         | 35           | 36           | 300          | 53           | 57           | 17           | -63 | +68    | -      | +5.3                            | +11.9      | - |
| 10        |              | 46.0         | 36           | 9            | 302          | 3            | 56           | 6            | -62 | +70    | -      | +5.5                            | +11.5      | - |
| 11        |              | 45.9         | 36           | 42           | 303          | 11           | 54           | 59           | -61 | +71    | -      | +5.6                            | +11.1      | - |
| 12        |              | 45.9         | 37           | 16           | 304          | 16           | 53           | 53           | -60 | +73    | -      | +5.8                            | +10.7      | - |
| 13        |              | 45.8         | 37           | 51           | 305          | 19           | 52           | 49           | -59 | +74    | -      | +5.9                            | +10.3      | - |
| 14        |              | 45.7         | 38           | 27           | 306          | 20           | 51           | 48           | -57 | +75    | -      | +6.1                            | +10.0      | - |
| 15        |              | 45.7         | 39           | 4            | 307          | 19           | 50           | 48           | -56 | +76    | -      | +6.2                            | +9.6       | - |
| 16        |              | 45.6         | 39           | 41           | 308          | 16           | 49           | 51           | -55 | +77    | -      | +6.3                            | +9.3       | - |
| 17        |              | 45.5         | 40           | 19           | 309          | 10           | 48           | 56           | -54 | +77    | -      | +6.4                            | +9.0       | - |
| 18        |              | 45.5         | 40           | 58           | 310          | 3            | 48           | 2            | -53 | +78    | -      | +6.6                            | +8.6       | - |
| 19        |              | 45.4         | 41           | 38           | 310          | 54           | 47           | 11           | -52 | +79    | -      | +6.7                            | +8.3       | - |
| +20       | 3            | 45.3         | 42           | 18           | 311          | 43           | 46           | 21           | -51 | +79    | -      | +6.8                            | +8.0       | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| +0        | +0.05      | -0.1       | 0.0          | +0.6         |
| 5         | 0.05       | 0.1        | 0.0          | 0.5          |
| 10        | 0.05       | 0.1        | +0.1         | 0.5          |
| 15        | 0.06       | 0.1        | 0.1          | 0.5          |
| +20       | +0.06      | -0.1       | +0.2         | +0.5         |



TABLE II.

Pair No. 37  
 E 72  $\beta$  Geminor. 1.2  $\alpha_{1950}$   $\delta_{1950}$   
 W 1  $\alpha$  Androm. 2.2 7 42.3 +28 9  
 0 5.8 +28 49

| $\varphi$ | S |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |              |              |
|-----------|---|------|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|--------------|--------------|
|           | h | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | $\Delta A_E$ | $\Delta A_W$ |
| +0        | 3 | 53.6 | 61 | 58 | 237   | 42 | 123   | 6  | -63 | -22    | +      | -5.4                            | +4.5         | -            |
| 1         |   | 53.6 | 61 | 26 | 238   | 9  | 122   | 38 | -63 | -21    | +      | -5.3                            | +4.6         | -            |
| 2         |   | 53.6 | 60 | 54 | 238   | 37 | 122   | 10 | -64 | -20    | +      | -5.3                            | +4.7         | -            |
| 3         |   | 53.6 | 60 | 23 | 239   | 6  | 121   | 42 | -64 | -19    | +      | -5.2                            | +4.9         | -            |
| 4         |   | 53.7 | 59 | 52 | 239   | 36 | 121   | 12 | -64 | -18    | +      | -5.1                            | +5.0         | -            |
| 5         |   | 53.7 | 59 | 22 | 240   | 6  | 120   | 42 | -64 | -16    | +      | -5.1                            | +5.1         | -            |
| 6         |   | 53.7 | 58 | 51 | 240   | 37 | 120   | 11 | -65 | -15    | +      | -5.0                            | +5.3         | -            |
| 7         |   | 53.8 | 58 | 22 | 241   | 9  | 119   | 39 | -65 | -14    | +      | -4.9                            | +5.4         | -            |
| 8         |   | 53.8 | 57 | 53 | 241   | 42 | 119   | 7  | -65 | -13    | +      | -4.8                            | +5.5         | -            |
| 9         |   | 53.8 | 57 | 24 | 242   | 15 | 118   | 33 | -65 | -11    | +      | -4.7                            | +5.7         | -            |
| 10        |   | 53.8 | 56 | 56 | 242   | 49 | 117   | 59 | -65 | -10    | +      | -4.6                            | +5.8         | -            |
| 11        |   | 53.9 | 56 | 29 | 243   | 25 | 117   | 24 | -66 | -8     | +      | -4.5                            | +5.9         | -            |
| 12        |   | 53.9 | 56 | 2  | 244   | 0  | 116   | 48 | -66 | -7     | +      | -4.4                            | +6.1         | -            |
| 13        |   | 53.9 | 55 | 35 | 244   | 37 | 116   | 12 | -66 | -6     | +      | -4.4                            | +6.2         | -            |
| 14        |   | 54.0 | 55 | 9  | 245   | 15 | 115   | 34 | -66 | -4     | +      | -4.3                            | +6.3         | -            |
| 15        |   | 54.0 | 54 | 44 | 245   | 53 | 114   | 56 | -66 | -2     | +      | -4.2                            | +6.5         | -            |
| 16        |   | 54.0 | 54 | 20 | 246   | 32 | 114   | 17 | -66 | -1     | +      | -4.1                            | +6.6         | -            |
| 17        |   | 54.1 | 53 | 56 | 247   | 12 | 113   | 38 | -66 | +1     | -      | -3.9                            | +6.7         | -            |
| 18        |   | 54.1 | 53 | 32 | 247   | 53 | 112   | 57 | -66 | +3     | -      | -3.8                            | +6.8         | -            |
| 19        |   | 54.1 | 53 | 10 | 248   | 34 | 112   | 16 | -66 | +4     | -      | -3.7                            | +7.0         | -            |
| +20       | 3 | 54.1 | 52 | 48 | 249   | 16 | 111   | 34 | -66 | +6     | -      | -3.6                            | +7.1         | -            |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| +0        | +0.05      | +0.1       | +0.2         | +0.4         |
| 5         | 0.05       | 0.1        | 0.2          | 0.4          |
| 10        | 0.05       | 0.1        | 0.2          | 0.4          |
| 15        | 0.06       | 0.1        | 0.2          | 0.4          |
| +20       | +0.06      | +0.1       | +0.2         | +0.4         |

Pair No. 38  
 E 75  $\delta$  Hydrae 4.2  $\alpha_{1950}$   $\delta_{1950}$   
 W 194  $\theta$  Piscium 4.5 8 35.0 +5 53  
 23 25.4 +6 6

| $\varphi$ | S |     | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |              |              |   |
|-----------|---|-----|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|--------------|--------------|---|
|           | h | m   | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | $\Delta A_E$ | $\Delta A_W$ |   |
| +0        | 4 | 0.2 | 69 | 27 | 263   | 43 | 96    | 31 | -75 | -      | 3      | +                               | -1.1         | +3.7         | - |
| 1         |   | 0.2 | 69 | 20 | 264   | 6  | 96    | 9  | -75 | -      | 2      | +                               | -1.1         | +3.8         | - |
| 2         |   | 0.2 | 69 | 14 | 264   | 28 | 95    | 46 | -75 | 0      |        |                                 | -1.0         | +3.8         | - |
| 3         |   | 0.2 | 69 | 8  | 264   | 51 | 95    | 23 | -75 | +      | 1      | -                               | -0.9         | +3.8         | - |
| 4         |   | 0.2 | 69 | 3  | 265   | 14 | 95    | 1  | -75 | +      | 3      | -                               | -0.9         | +3.8         | - |
| 5         |   | 0.2 | 68 | 58 | 265   | 37 | 94    | 38 | -75 | +      | 4      | -                               | -0.8         | +3.8         | - |
| 6         |   | 0.3 | 68 | 53 | 266   | 0  | 94    | 15 | -75 | +      | 6      | -                               | -0.7         | +3.9         | - |
| 7         |   | 0.3 | 68 | 49 | 266   | 23 | 93    | 52 | -74 | +      | 7      | -                               | -0.7         | +3.9         | - |
| 8         |   | 0.3 | 68 | 46 | 266   | 46 | 93    | 28 | -74 | +      | 9      | -                               | -0.6         | +3.9         | - |
| 9         |   | 0.3 | 68 | 42 | 267   | 10 | 93    | 5  | -74 | +      | 10     | -                               | -0.5         | +3.9         | - |
| 10        |   | 0.3 | 68 | 39 | 267   | 33 | 92    | 42 | -74 | +      | 12     | -                               | -0.5         | +3.9         | - |
| 11        |   | 0.3 | 68 | 37 | 267   | 56 | 92    | 18 | -74 | +      | 13     | -                               | -0.4         | +3.9         | - |
| 12        |   | 0.3 | 68 | 35 | 268   | 20 | 91    | 55 | -73 | +      | 15     | -                               | -0.3         | +3.9         | - |
| 13        |   | 0.3 | 68 | 33 | 268   | 44 | 91    | 31 | -73 | +      | 16     | -                               | -0.2         | +3.9         | - |
| 14        |   | 0.3 | 68 | 32 | 269   | 7  | 91    | 8  | -73 | +      | 18     | -                               | -0.2         | +3.9         | - |
| 15        |   | 0.3 | 68 | 31 | 269   | 31 | 90    | 44 | -72 | +      | 19     | -                               | -0.1         | +3.9         | - |
| 16        |   | 0.3 | 68 | 31 | 269   | 54 | 90    | 21 | -72 | +      | 21     | -                               | 0.0          | +3.9         | - |
| 17        |   | 0.4 | 68 | 31 | 270   | 18 | 89    | 57 | -72 | +      | 22     | -                               | 0.0          | +3.9         | - |
| 18        |   | 0.4 | 68 | 31 | 270   | 42 | 89    | 34 | -71 | +      | 24     | -                               | +0.1         | +3.9         | - |
| 19        |   | 0.4 | 68 | 32 | 271   | 5  | 89    | 10 | -71 | +      | 25     | -                               | +0.2         | +4.0         | - |
| +20       | 4 | 0.4 | 68 | 33 | 271   | 29 | 88    | 46 | -70 | +      | 26     | -                               | +0.2         | +4.0         | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| +0        | +0.05      | 0.0        | +0.2         | +0.4         |
| 5         | 0.05       | 0.0        | 0.2          | 0.4          |
| 10        | 0.05       | 0.0        | 0.2          | 0.4          |
| 15        | 0.06       | 0.0        | 0.2          | 0.4          |
| +20       | +0.06      | 0.0        | +0.2         | +0.4         |



TABLE II.

|             | No.  | Star             | Mag.    | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|------|------------------|---------|---------------------------|---------------------------|
|             |      |                  |         | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 39 | E 58 | $\eta$ Geminor.  | 3.3-4.2 | 6 11.9                    | +22 31                    |
|             | W 17 | $\alpha$ Arietis | 2.2     | 2 4.3                     | +23 14                    |

| $\phi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |              |              |   |
|--------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|------------------------------|--------------|--------------|---|
|        | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                   | $\Delta A_E$ | $\Delta A_W$ |   |
| +0     | 4            | 7.1          | 38           | 16           | 231          | 49           | 129          | 33           | -58 | -61    | +      | -6.3                         | +            | 9.8          | - |
| -1     |              | 7.2          | 37           | 39           | 232          | 50           | 128          | 33           | -59 | -60    | +      | -6.1                         | +            | 10.2         | - |
| -2     |              | 7.2          | 37           | 3            | 233          | 52           | 127          | 30           | -60 | -59    | +      | -6.0                         | +            | 10.6         | - |
| -3     |              | 7.3          | 36           | 27           | 234          | 57           | 126          | 26           | -60 | -57    | +      | -5.8                         | +            | 11.0         | - |
| -4     |              | 7.3          | 35           | 53           | 236          | 4            | 125          | 48           | -61 | -55    | +      | -5.7                         | +            | 11.4         | - |
| -5     |              | 7.4          | 35           | 19           | 237          | 14           | 124          | 9            | -62 | -53    | +      | -5.5                         | +            | 11.8         | - |
| -6     |              | 7.4          | 34           | 46           | 238          | 26           | 122          | 57           | -63 | -51    | +      | -5.3                         | +            | 12.2         | - |
| -7     |              | 7.5          | 34           | 15           | 239          | 40           | 121          | 43           | -64 | -49    | +      | -5.2                         | +            | 12.6         | - |
| -8     |              | 7.5          | 33           | 45           | 240          | 57           | 120          | 26           | -64 | -46    | +      | -5.0                         | +            | 13.0         | - |
| -9     |              | 7.5          | 33           | 16           | 242          | 16           | 119          | 7            | -65 | -44    | +      | -4.8                         | +            | 13.4         | - |
| -10    |              | 7.6          | 32           | 48           | 243          | 38           | 117          | 46           | -66 | -41    | +      | -4.6                         | +            | 13.9         | - |
| -11    |              | 7.6          | 32           | 21           | 245          | 2            | 116          | 21           | -66 | -38    | +      | -4.3                         | +            | 14.3         | - |
| -12    |              | 7.7          | 31           | 56           | 246          | 29           | 114          | 55           | -67 | -34    | +      | -4.2                         | +            | 14.7         | - |
| -13    |              | 7.8          | 31           | 32           | 247          | 58           | 113          | 26           | -67 | -31    | +      | -3.9                         | +            | 15.1         | - |
| -14    |              | 7.8          | 31           | 9            | 249          | 30           | 111          | 55           | -68 | -27    | +      | -3.6                         | +            | 15.4         | - |
| -15    |              | 7.9          | 30           | 48           | 251          | 3            | 110          | 22           | -68 | -23    | +      | -3.4                         | +            | 15.8         | - |
| -16    |              | 7.9          | 30           | 29           | 252          | 39           | 108          | 46           | -68 | -19    | +      | -3.1                         | +            | 16.2         | - |
| -17    |              | 8.0          | 30           | 11           | 254          | 17           | 107          | 9            | -69 | -14    | +      | -2.8                         | +            | 16.5         | - |
| -18    |              | 8.0          | 29           | 55           | 255          | 57           | 105          | 29           | -69 | -10    | +      | -2.5                         | +            | 16.8         | - |
| -19    |              | 8.1          | 29           | 41           | 257          | 39           | 103          | 48           | -69 | -5     | +      | -2.3                         | +            | 17.2         | - |
| +20    | 4            | 8.1          | 29           | 28           | 259          | 23           | 102          | 4            | -69 | 0      |        | -2.0                         | +            | 17.5         | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| +0     | +0.05      | +0.1       | +0.1         | +0.5         |
| 5      | 0.05       | 0.1        | 0.1          | 0.5          |
| 10     | 0.05       | 0.1        | 0.1          | 0.5          |
| 15     | 0.06       | +0.1       | +0.1         | 0.6          |
| +20    | +0.06      | 0.0        | 0.0          | +0.6         |

DATA REQUIRED FOR OBSERVATION.

|             | No.  | Star               | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|------|--------------------|------|---------------------------|---------------------------|
|             |      |                    |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 40 | E 70 | $\beta$ Canis Min. | 3.1  | 7 24.4                    | +8 24                     |
|             | W 6  | $\epsilon$ Piscium | 4.5  | 1 0.3                     | +7 37                     |

| $\phi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |              |              |   |
|--------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|------------------------------|--------------|--------------|---|
|        | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                   | $\Delta A_E$ | $\Delta A_W$ |   |
| +0     | 4            | 12.6         | 49           | 8            | 258          | 52           | 100          | 6            | -74 | -12    | +      | -1.8                         | +            | 8.5          | - |
| -1     |              | 12.6         | 48           | 57           | 259          | 43           | 99           | 14           | -74 | -10    | +      | -1.7                         | +            | 8.6          | - |
| -2     |              | 12.5         | 48           | 47           | 260          | 35           | 98           | 23           | -74 | -8     | +      | -1.6                         | +            | 8.6          | - |
| -3     |              | 12.5         | 48           | 38           | 261          | 27           | 97           | 31           | -74 | -6     | +      | -1.4                         | +            | 8.7          | - |
| -4     |              | 12.5         | 48           | 31           | 262          | 20           | 96           | 38           | -74 | -3     | +      | -1.2                         | +            | 8.8          | - |
| -5     |              | 12.4         | 48           | 24           | 263          | 12           | 95           | 45           | -74 | -1     | +      | -1.1                         | +            | 8.8          | - |
| -6     |              | 12.4         | 48           | 17           | 264          | 5            | 94           | 52           | -74 | +2     | -      | -0.9                         | +            | 8.9          | - |
| -7     |              | 12.3         | 48           | 12           | 264          | 59           | 93           | 59           | -74 | +4     | -      | -0.8                         | +            | 8.9          | - |
| -8     |              | 12.3         | 48           | 8            | 265          | 52           | 93           | 5            | -74 | +6     | -      | -0.6                         | +            | 8.9          | - |
| -9     |              | 12.3         | 48           | 5            | 266          | 46           | 92           | 11           | -74 | +9     | -      | -0.5                         | +            | 9.0          | - |
| -10    |              | 12.2         | 48           | 2            | 267          | 40           | 91           | 17           | -74 | +11    | -      | -0.3                         | +            | 9.0          | - |
| -11    |              | 12.2         | 48           | 1            | 268          | 33           | 90           | 23           | -74 | +13    | -      | -0.2                         | +            | 9.0          | - |
| -12    |              | 12.2         | 48           | 0            | 269          | 27           | 89           | 29           | -73 | +16    | -      | 0.0                          | +            | 9.0          | - |
| -13    |              | 12.1         | 48           | 1            | 270          | 21           | 88           | 35           | -73 | +18    | -      | +0.2                         | +            | 9.0          | - |
| -14    |              | 12.1         | 48           | 2            | 271          | 15           | 87           | 41           | -73 | +21    | -      | +0.3                         | +            | 9.0          | - |
| -15    |              | 12.0         | 48           | 5            | 272          | 9            | 86           | 47           | -72 | +23    | -      | +0.5                         | +            | 9.0          | - |
| -16    |              | 12.0         | 48           | 8            | 273          | 2            | 85           | 53           | -72 | +25    | -      | +0.6                         | +            | 8.9          | - |
| -17    |              | 12.0         | 48           | 12           | 273          | 56           | 84           | 59           | -72 | +27    | -      | +0.8                         | +            | 8.9          | - |
| -18    |              | 11.9         | 48           | 17           | 274          | 49           | 84           | 6            | -71 | +30    | -      | +0.9                         | +            | 8.8          | - |
| -19    |              | 11.9         | 48           | 23           | 275          | 42           | 83           | 13           | -70 | +32    | -      | +1.1                         | +            | 8.8          | - |
| +20    | 4            | 11.8         | 48           | 30           | 276          | 34           | 82           | 19           | -70 | +34    | -      | +1.3                         | +            | 8.7          | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| +0     | +0.05      | 0.0        | +0.2         | +0.4         |
| 5      | 0.05       | 0.0        | 0.2          | 0.4          |
| 10     | 0.05       | 0.0        | 0.2          | 0.4          |
| 15     | 0.06       | 0.0        | 0.2          | 0.5          |
| +20    | +0.06      | 0.0        | +0.2         | +0.5         |



TABLE II.

|             |   | No. | Star              | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|---|-----|-------------------|------|---------------------------|---------------------------|
|             |   |     |                   |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 41 | E | 77  | $\epsilon$ Hydrae | 3.5  | 8 44.1                    | +6 36                     |
|             | W | 196 | $\omega$ Piscium  | 4.0  | 23 56 7                   | +6 35                     |

| $\varphi$ | S                         |                           | z                         |                           | $A_E$                     |                           | $A_W$        |              | dz   | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------------|--------------|------|--------|--------|---------------------------------|------------|---|
|           | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>'</sup> | <sup>'</sup> |      |        |        | $\Delta z$                      | $\Delta A$ | E |
| + 0       | 4 20.4                    | 66 43                     | 262 48                    | 97 10                     | -74                       | -                         | 4            | +            | -1.2 | + 4.3  | -      |                                 |            |   |
| 1         | 20.4                      | 66 36                     | 263 14                    | 96 45                     | -75                       | -                         | 3            | +            | -1.2 | + 4.3  | -      |                                 |            |   |
| 2         | 20.4                      | 66 29                     | 263 40                    | 96 19                     | -75                       | -                         | 1            | +            | -1.1 | + 4.3  | -      |                                 |            |   |
| 3         | 20.4                      | 66 23                     | 264 6                     | 95 53                     | -75                       | +                         | 1            | -            | -1.0 | + 4.4  | -      |                                 |            |   |
| 4         | 20.4                      | 66 17                     | 264 32                    | 95 27                     | -75                       | +                         | 2            | -            | -1.0 | + 4.4  | -      |                                 |            |   |
| 5         | 20.4                      | 66 11                     | 264 59                    | 95 0                      | -75                       | +                         | 4            | -            | -0.9 | + 4.4  | -      |                                 |            |   |
| 6         | 20.4                      | 66 6                      | 265 25                    | 94 34                     | -75                       | +                         | 5            | -            | -0.8 | + 4.4  | -      |                                 |            |   |
| 7         | 20.4                      | 66 1                      | 265 52                    | 94 7                      | -74                       | +                         | 7            | -            | -0.7 | + 4.4  | -      |                                 |            |   |
| 8         | 20.4                      | 65 57                     | 266 18                    | 93 41                     | -74                       | +                         | 8            | -            | -0.7 | + 4.5  | -      |                                 |            |   |
| 9         | 20.4                      | 65 53                     | 266 45                    | 93 14                     | -74                       | +                         | 10           | -            | -0.6 | + 4.5  | -      |                                 |            |   |
| 10        | 20.4                      | 65 50                     | 267 12                    | 92 47                     | -74                       | +                         | 11           | -            | -0.5 | + 4.5  | -      |                                 |            |   |
| 11        | 20.4                      | 65 48                     | 267 39                    | 92 20                     | -74                       | +                         | 13           | -            | -0.4 | + 4.5  | -      |                                 |            |   |
| 12        | 20.4                      | 65 45                     | 268 6                     | 91 53                     | -73                       | +                         | 15           | -            | -0.3 | + 4.5  | -      |                                 |            |   |
| 13        | 20.4                      | 65 44                     | 268 33                    | 91 26                     | -73                       | +                         | 16           | -            | -0.2 | + 4.5  | -      |                                 |            |   |
| 14        | 20.4                      | 65 42                     | 269 0                     | 90 59                     | -73                       | +                         | 18           | -            | -0.2 | + 4.5  | -      |                                 |            |   |
| 15        | 20.4                      | 65 42                     | 269 27                    | 90 32                     | -72                       | +                         | 19           | -            | -0.1 | + 4.5  | -      |                                 |            |   |
| 16        | 20.4                      | 65 41                     | 269 54                    | 90 5                      | -72                       | +                         | 21           | -            | 0.0  | + 4.5  | -      |                                 |            |   |
| 17        | 20.4                      | 65 42                     | 270 21                    | 89 38                     | -72                       | +                         | 22           | -            | +0.1 | + 4.5  | -      |                                 |            |   |
| 18        | 20.4                      | 65 42                     | 270 48                    | 89 11                     | -71                       | +                         | 24           | -            | +0.1 | + 4.5  | -      |                                 |            |   |
| 19        | 20.4                      | 65 43                     | 271 15                    | 88 44                     | -71                       | +                         | 25           | -            | +0.2 | + 4.5  | -      |                                 |            |   |
| +20       | 4 20.4                    | 65 45                     | 271 42                    | 88 17                     | -70                       | +                         | 27           | -            | +0.3 | + 4.5  | -      |                                 |            |   |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| + 0       | +0.05      | 0.0        | +0.2         | +0.4         |
| 5         | 0.05       | 0.0        | 0.2          | 0.4          |
| 10        | 0.06       | 0.0        | 0.3          | 0.4          |
| 15        | 0.06       | 0.0        | 0.3          | 0.4          |
| +20       | +0.06      | 0.0        | +0.3         | +0.4         |

|             |   | No. | Star             | Mag.    | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|---|-----|------------------|---------|---------------------------|---------------------------|
|             |   |     |                  |         | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 42 | E | 65  | $\zeta$ Geminor. | 3.7-4.1 | 7 1.1                     | +20 39                    |
|             | W | 15  | $\beta$ Arietis  | 2.7     | 1 51 9                    | +20 34                    |

| $\varphi$ | S                         |                           | z                         |                           | $A_E$                     |                           | $A_W$        |              | dz   | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------------|--------------|------|--------|--------|---------------------------------|------------|---|
|           | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>'</sup> | <sup>'</sup> |      |        |        | $\Delta z$                      | $\Delta A$ | E |
| + 0       | 4 26.6                    | 43 34                     | 239 14                    | 120 38                    | -64                       | -                         | 41           | +            | -5.1 | + 9.0  | -      |                                 |            |   |
| 1         | 26.6                      | 43 4                      | 240 9                     | 119 43                    | -65                       | -                         | 40           | +            | -5.0 | + 9.3  | -      |                                 |            |   |
| 2         | 26.6                      | 42 35                     | 241 6                     | 118 47                    | -66                       | -                         | 38           | +            | -4.8 | + 9.5  | -      |                                 |            |   |
| 3         | 26.6                      | 42 6                      | 242 4                     | 117 49                    | -66                       | -                         | 36           | +            | -4.7 | + 9.8  | -      |                                 |            |   |
| 4         | 26.6                      | 41 39                     | 243 3                     | 116 49                    | -67                       | -                         | 34           | +            | -4.5 | + 10.0 | -      |                                 |            |   |
| 5         | 26.6                      | 41 12                     | 244 4                     | 115 48                    | -67                       | -                         | 32           | +            | -4.4 | + 10.3 | -      |                                 |            |   |
| 6         | 26.6                      | 40 46                     | 245 6                     | 114 46                    | -68                       | -                         | 30           | +            | -4.2 | + 10.5 | -      |                                 |            |   |
| 7         | 26.6                      | 40 22                     | 246 10                    | 113 42                    | -68                       | -                         | 27           | +            | -4.0 | + 10.8 | -      |                                 |            |   |
| 8         | 26.6                      | 39 58                     | 247 16                    | 112 37                    | -68                       | -                         | 25           | +            | -3.9 | + 11.0 | -      |                                 |            |   |
| 9         | 26.6                      | 39 35                     | 248 22                    | 111 30                    | -69                       | -                         | 22           | +            | -3.7 | + 11.2 | -      |                                 |            |   |
| 10        | 26.5                      | 39 14                     | 249 30                    | 110 22                    | -69                       | -                         | 19           | +            | -3.5 | + 11.5 | -      |                                 |            |   |
| 11        | 26.5                      | 38 53                     | 250 40                    | 109 12                    | -69                       | -                         | 17           | +            | -3.3 | + 11.7 | -      |                                 |            |   |
| 12        | 26.5                      | 38 34                     | 251 51                    | 108 1                     | -70                       | -                         | 14           | +            | -3.1 | + 11.9 | -      |                                 |            |   |
| 13        | 26.5                      | 38 16                     | 253 3                     | 107 49                    | -70                       | -                         | 11           | +            | -2.9 | + 12.1 | -      |                                 |            |   |
| 14        | 26.5                      | 37 59                     | 254 16                    | 105 36                    | -70                       | -                         | 8            | +            | -2.7 | + 12.3 | -      |                                 |            |   |
| 15        | 26.5                      | 37 44                     | 255 31                    | 104 21                    | -70                       | -                         | 4            | +            | -2.5 | + 12.5 | -      |                                 |            |   |
| 16        | 26.5                      | 37 30                     | 256 46                    | 103 6                     | -70                       | -                         | 1            | +            | -2.3 | + 12.7 | -      |                                 |            |   |
| 17        | 26.5                      | 37 17                     | 258 3                     | 101 49                    | -70                       | +                         | 2            | -            | -2.1 | + 12.8 | -      |                                 |            |   |
| 18        | 26.5                      | 37 5                      | 259 20                    | 100 32                    | -70                       | +                         | 6            | -            | -1.8 | + 13.0 | -      |                                 |            |   |
| 19        | 26.5                      | 36 55                     | 260 39                    | 99 13                     | -70                       | +                         | 9            | -            | -1.6 | + 13.1 | -      |                                 |            |   |
| +20       | 4 26.5                    | 36 46                     | 261 58                    | 97 54                     | -70                       | +                         | 12           | -            | -1.4 | + 13.3 | -      |                                 |            |   |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| + 0       | +0.05      | +0.1       | +0.2         | +0.4         |
| 5         | 0.05       | 0.1        | 0.2          | 0.5          |
| 10        | 0.06       | +0.1       | 0.2          | 0.5          |
| 15        | 0.06       | 0.0        | 0.2          | 0.5          |
| +20       | +0.06      | 0.0        | +0.2         | +0.5         |



Pair No. 43  
 E 69  $\iota$  Geminor. 3.9  $\alpha_{1950}$   $\delta_{1950}$   
 W 13  $\alpha$  Trianguli 3.6 1 50.2 +29 20

| $\varphi$ | S |      |    | $A_E$ |     | $A_W$ |     | dz | dA <sub>E</sub> | dA <sub>W</sub> | Var. for $\Delta\varphi = +10'$ |   |      |   |      |   |
|-----------|---|------|----|-------|-----|-------|-----|----|-----------------|-----------------|---------------------------------|---|------|---|------|---|
|           | h | m    | s  | °     | '   | °     | '   |    |                 |                 | $\Delta z$                      | E | W    |   |      |   |
| +0        | 4 | 34.7 | 49 | 25    | 231 | 59    | 130 | 11 | -58             | -               | 41                              | + | -6.3 | + | 6.6  | - |
| 1         |   | 34.7 | 48 | 47    | 232 | 40    | 129 | 30 | -59             | -               | 40                              | + | -6.2 | + | 6.9  | - |
| 2         |   | 34.8 | 48 | 10    | 233 | 22    | 128 | 49 | -59             | -               | 39                              | + | -6.1 | + | 7.1  | - |
| 3         |   | 34.9 | 47 | 34    | 234 | 5     | 128 | 6  | -60             | -               | 38                              | + | -6.0 | + | 7.3  | - |
| 4         |   | 35.0 | 46 | 58    | 234 | 49    | 127 | 21 | -60             | -               | 37                              | + | -5.9 | + | 7.6  | - |
| 5         |   | 35.0 | 46 | 23    | 235 | 35    | 126 | 35 | -61             | -               | 36                              | + | -5.8 | + | 7.8  | - |
| 6         |   | 35.1 | 45 | 48    | 236 | 23    | 125 | 48 | -61             | -               | 34                              | + | -5.7 | + | 8.0  | - |
| 7         |   | 35.2 | 45 | 15    | 237 | 12    | 125 | 0  | -62             | -               | 33                              | + | -5.6 | + | 8.3  | - |
| 8         |   | 35.3 | 44 | 42    | 238 | 2     | 124 | 10 | -62             | -               | 32                              | + | -5.5 | + | 8.5  | - |
| 9         |   | 35.3 | 44 | 9     | 238 | 54    | 123 | 18 | -62             | -               | 30                              | + | -5.3 | + | 8.7  | - |
| 10        |   | 35.4 | 43 | 38    | 239 | 47    | 122 | 25 | -63             | -               | 28                              | + | -5.2 | + | 9.0  | - |
| 11        |   | 35.5 | 43 | 7     | 240 | 41    | 121 | 31 | -63             | -               | 26                              | + | -5.1 | + | 9.3  | - |
| 12        |   | 35.6 | 42 | 37    | 241 | 38    | 120 | 35 | -64             | -               | 25                              | + | -4.9 | + | 9.5  | - |
| 13        |   | 35.7 | 42 | 8     | 242 | 36    | 119 | 38 | -64             | -               | 23                              | + | -4.8 | + | 9.8  | - |
| 14        |   | 35.7 | 41 | 40    | 243 | 35    | 118 | 39 | -64             | -               | 21                              | + | -4.6 | + | 10.0 | - |
| 15        |   | 35.8 | 41 | 12    | 244 | 36    | 117 | 39 | -65             | -               | 18                              | + | -4.5 | + | 10.3 | - |
| 16        |   | 35.9 | 40 | 46    | 245 | 38    | 116 | 37 | -65             | -               | 16                              | + | -4.3 | + | 10.5 | - |
| 17        |   | 36.0 | 40 | 21    | 246 | 42    | 115 | 34 | -65             | -               | 14                              | + | -4.1 | + | 10.8 | - |
| 18        |   | 36.1 | 39 | 56    | 247 | 47    | 114 | 30 | -65             | -               | 11                              | + | -4.0 | + | 11.0 | - |
| 19        |   | 36.2 | 39 | 33    | 248 | 54    | 113 | 23 | -66             | -               | 9                               | + | -3.8 | + | 11.3 | - |
| +20       | 4 | 36.2 | 39 | 11    | 250 | 3     | 112 | 16 | -66             | -               | 6                               | + | -3.6 | + | 11.5 | - |

Annual Precessions of S, z, A<sub>E</sub>, and A<sub>W</sub>.

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| +0        | +0.05      | +0.1       | +0.2         | +0.4         |
| 5         | 0.05       | 0.1        | 0.2          | 0.4          |
| 10        | 0.06       | 0.1        | 0.2          | 0.4          |
| 15        | 0.06       | +0.1       | 0.2          | 0.4          |
| +20       | +0.06      | 0.0        | +0.2         | +0.5         |

Pair No. 44  
 E 63  $\delta$  Geminor. 3.5  $\alpha_{1950}$   $\delta_{1950}$   
 W 17  $\alpha$  Arietis 2.2 2 4.3 +23 14

| $\varphi$ | S |      |    | $A_E$ |     | $A_W$ |     | dz | dA <sub>E</sub> | dA <sub>W</sub> | Var. for $\Delta\varphi = +10'$ |   |      |   |      |   |
|-----------|---|------|----|-------|-----|-------|-----|----|-----------------|-----------------|---------------------------------|---|------|---|------|---|
|           | h | m    | s  | °     | '   | °     | '   |    |                 |                 | $\Delta z$                      | E | W    |   |      |   |
| +0        | 4 | 39.6 | 44 | 47    | 237 | 46    | 124 | 3  | -63             | -               | 42                              | + | -5.5 | + | 8.4  | - |
| 1         |   | 39.6 | 44 | 14    | 238 | 38    | 123 | 12 | -63             | -               | 41                              | + | -5.4 | + | 8.7  | - |
| 2         |   | 39.7 | 43 | 43    | 239 | 30    | 122 | 19 | -64             | -               | 39                              | + | -5.2 | + | 8.9  | - |
| 3         |   | 39.8 | 43 | 12    | 240 | 25    | 121 | 25 | -64             | -               | 38                              | + | -5.1 | + | 9.2  | - |
| 4         |   | 39.8 | 42 | 42    | 241 | 21    | 120 | 29 | -65             | -               | 36                              | + | -4.9 | + | 9.5  | - |
| 5         |   | 39.9 | 42 | 13    | 242 | 18    | 119 | 32 | -65             | -               | 34                              | + | -4.8 | + | 9.7  | - |
| 6         |   | 39.9 | 41 | 44    | 243 | 17    | 118 | 33 | -66             | -               | 32                              | + | -4.6 | + | 10.0 | - |
| 7         |   | 40.0 | 41 | 17    | 244 | 18    | 117 | 33 | -66             | -               | 30                              | + | -4.5 | + | 10.2 | - |
| 8         |   | 40.1 | 40 | 51    | 245 | 20    | 116 | 31 | -67             | -               | 28                              | + | -4.3 | + | 10.5 | - |
| 9         |   | 40.1 | 40 | 25    | 246 | 23    | 115 | 28 | -67             | -               | 25                              | + | -4.2 | + | 10.7 | - |
| 10        |   | 40.2 | 40 | 1     | 247 | 28    | 114 | 23 | -68             | -               | 23                              | + | -4.0 | + | 11.0 | - |
| 11        |   | 40.3 | 39 | 37    | 248 | 34    | 113 | 17 | -68             | -               | 20                              | + | -3.8 | + | 11.2 | - |
| 12        |   | 40.3 | 39 | 15    | 249 | 42    | 112 | 9  | -68             | -               | 18                              | + | -3.6 | + | 11.4 | - |
| 13        |   | 40.4 | 38 | 54    | 250 | 52    | 111 | 1  | -69             | -               | 15                              | + | -3.4 | + | 11.7 | - |
| 14        |   | 40.5 | 38 | 34    | 252 | 2     | 109 | 50 | -69             | -               | 12                              | + | -3.2 | + | 11.9 | - |
| 15        |   | 40.5 | 38 | 15    | 253 | 14    | 108 | 39 | -69             | -               | 9                               | + | -3.1 | + | 12.1 | - |
| 16        |   | 40.6 | 37 | 57    | 254 | 28    | 107 | 26 | -69             | -               | 6                               | + | -2.8 | + | 12.3 | - |
| 17        |   | 40.7 | 37 | 41    | 255 | 42    | 106 | 12 | -69             | -               | 3                               | + | -2.6 | + | 12.5 | - |
| 18        |   | 40.8 | 37 | 26    | 256 | 58    | 104 | 57 | -69             | -               | 0                               | + | -2.4 | + | 12.7 | - |
| 19        |   | 40.8 | 37 | 12    | 258 | 15    | 103 | 41 | -69             | +               | 3                               | - | -2.2 | + | 12.9 | - |
| +20       | 4 | 40.9 | 37 | 0     | 259 | 33    | 102 | 23 | -69             | +               | 7                               | - | -2.0 | + | 13.1 | - |

Annual Precessions of S, z, A<sub>E</sub>, and A<sub>W</sub>.

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| +0        | +0.05      | +0.1       | +0.2         | +0.4         |
| 5         | 0.05       | 0.1        | 0.2          | 0.4          |
| 10        | 0.06       | +0.1       | 0.2          | 0.5          |
| 15        | 0.06       | 0.0        | 0.2          | 0.5          |
| +20       | +0.06      | 0.0        | +0.2         | +0.5         |



TABLE II.

|             |   | No. | Star               | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|---|-----|--------------------|------|---------------------------|---------------------------|
|             |   |     |                    |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 45 | E | 72  | $\beta$ Geminor.   | 1.2  | 7 42.3                    | +28 9                     |
|             | W | 13  | $\alpha$ Trianguli | 3.6  | 1 50.2                    | +29 20                    |

| $\varphi$ | S                         |                           | z                         |                           | $A_E$                     |                           | $A_W$        |              | dz    | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------------|--------------|-------|--------|--------|---------------------------------|------------|---|
|           | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>'</sup> | <sup>'</sup> |       |        |        | $\Delta z$                      | $\Delta A$ | E |
| +0        | 4 44.9                    | 51 24                     | 232 53                    | 128 50                    | -59                       | -38                       | +            | -6.2         | +6.3  | -      |        |                                 |            |   |
| 1         | 45.0                      | 50 47                     | 233 31                    | 128 12                    | -59                       | -37                       | +            | -6.1         | +6.5  | -      |        |                                 |            |   |
| 2         | 45.0                      | 50 11                     | 234 11                    | 127 32                    | -60                       | -36                       | +            | -6.0         | +6.7  | -      |        |                                 |            |   |
| 3         | 45.1                      | 49 35                     | 234 51                    | 126 51                    | -60                       | -35                       | +            | -5.9         | +6.9  | -      |        |                                 |            |   |
| 4         | 45.1                      | 49 0                      | 235 33                    | 126 9                     | -61                       | -33                       | +            | -5.8         | +7.1  | -      |        |                                 |            |   |
| 5         | 45.2                      | 48 26                     | 236 17                    | 125 26                    | -61                       | -32                       | +            | -5.7         | +7.3  | -      |        |                                 |            |   |
| 6         | 45.3                      | 47 52                     | 237 1                     | 124 42                    | -62                       | -31                       | +            | -5.6         | +7.5  | -      |        |                                 |            |   |
| 7         | 45.3                      | 47 19                     | 237 47                    | 123 56                    | -62                       | -29                       | +            | -5.5         | +7.8  | -      |        |                                 |            |   |
| 8         | 45.4                      | 46 47                     | 238 34                    | 123 9                     | -63                       | -28                       | +            | -5.3         | +8.0  | -      |        |                                 |            |   |
| 9         | 45.4                      | 46 15                     | 239 23                    | 122 21                    | -63                       | -26                       | +            | -5.2         | +8.2  | -      |        |                                 |            |   |
| 10        | 45.5                      | 45 44                     | 240 12                    | 121 32                    | -63                       | -25                       | +            | -5.1         | +8.4  | -      |        |                                 |            |   |
| 11        | 45.6                      | 45 14                     | 241 4                     | 120 41                    | -64                       | -23                       | +            | -5.0         | +8.6  | -      |        |                                 |            |   |
| 12        | 45.6                      | 44 44                     | 241 56                    | 119 49                    | -64                       | -21                       | +            | -4.8         | +8.9  | -      |        |                                 |            |   |
| 13        | 45.7                      | 44 16                     | 242 50                    | 118 55                    | -64                       | -19                       | +            | -4.7         | +9.1  | -      |        |                                 |            |   |
| 14        | 45.8                      | 43 48                     | 243 45                    | 118 1                     | -65                       | -17                       | +            | -4.6         | +9.3  | -      |        |                                 |            |   |
| 15        | 45.8                      | 43 21                     | 244 42                    | 117 5                     | -65                       | -15                       | +            | -4.4         | +9.5  | -      |        |                                 |            |   |
| 16        | 45.9                      | 42 55                     | 245 40                    | 116 7                     | -65                       | -13                       | +            | -4.3         | +9.8  | -      |        |                                 |            |   |
| 17        | 45.9                      | 42 30                     | 246 39                    | 115 8                     | -65                       | -11                       | +            | -4.1         | +10.0 | -      |        |                                 |            |   |
| 18        | 46.0                      | 42 6                      | 247 40                    | 114 8                     | -65                       | -9                        | +            | -3.9         | +10.2 | -      |        |                                 |            |   |
| 19        | 46.1                      | 41 42                     | 248 42                    | 113 7                     | -66                       | -6                        | +            | -3.8         | +10.5 | -      |        |                                 |            |   |
| +20       | 4 46.1                    | 41 20                     | 249 45                    | 112 4                     | -66                       | -4                        | +            | -3.6         | +10.7 | -      |        |                                 |            |   |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| +0        | +0.05      | +0.1       | +0.3         | +0.4         |
| 5         | 0.05       | 0.1        | 0.2          | 0.4          |
| 10        | 0.6        | 0.1        | 0.2          | 0.4          |
| 15        | 0.06       | +0.1       | 0.2          | 0.4          |
| +20       | +0.06      | 0.0        | +0.2         | +0.5         |

DATA REQUIRED FOR OBSERVATION.

|             |   | No. | Star               | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|---|-----|--------------------|------|---------------------------|---------------------------|
|             |   |     |                    |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 46 | E | 77  | $\epsilon$ Hydrae  | 3.5  | 8 44.1                    | +6 36                     |
|             | W | 6   | $\epsilon$ Piscium | 4.5  | 1 0.3                     | +7 37                     |

| $\varphi$ | S                         |                           | z                         |                           | $A_E$                     |                           | $A_W$        |              | dz   | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------------|--------------|------|--------|--------|---------------------------------|------------|---|
|           | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>'</sup> | <sup>'</sup> |      |        |        | $\Delta z$                      | $\Delta A$ | E |
| +0        | 4 52.1                    | 58 52                     | 262 17                    | 98 55                     | -74                       | -7                        | +            | -1.4         | +6.0 | -      |        |                                 |            |   |
| 1         | 52.1                      | 58 44                     | 262 53                    | 98 19                     | -74                       | -5                        | +            | -1.3         | +6.0 | -      |        |                                 |            |   |
| 2         | 52.2                      | 58 36                     | 263 29                    | 97 43                     | -74                       | -3                        | +            | -1.2         | +6.1 | -      |        |                                 |            |   |
| 3         | 52.2                      | 58 29                     | 264 6                     | 97 6                      | -74                       | -2                        | +            | -1.1         | +6.1 | -      |        |                                 |            |   |
| 4         | 52.3                      | 58 22                     | 264 42                    | 96 30                     | -74                       | 0                         |              | -1.0         | +6.1 | -      |        |                                 |            |   |
| 5         | 52.3                      | 58 17                     | 265 19                    | 95 53                     | -74                       | +2                        | -            | -0.9         | +6.2 | -      |        |                                 |            |   |
| 6         | 52.3                      | 58 11                     | 265 56                    | 95 16                     | -74                       | +4                        | -            | -0.8         | +6.2 | -      |        |                                 |            |   |
| 7         | 52.4                      | 58 7                      | 266 34                    | 94 39                     | -74                       | +6                        | -            | -0.7         | +6.2 | -      |        |                                 |            |   |
| 8         | 52.4                      | 58 3                      | 267 11                    | 94 2                      | -74                       | +8                        | -            | -0.6         | +6.2 | -      |        |                                 |            |   |
| 9         | 52.5                      | 58 0                      | 267 48                    | 93 24                     | -74                       | +10                       | -            | -0.5         | +6.3 | -      |        |                                 |            |   |
| 10        | 52.5                      | 57 57                     | 268 26                    | 92 47                     | -74                       | +11                       | -            | -0.4         | +6.3 | -      |        |                                 |            |   |
| 11        | 52.5                      | 57 55                     | 269 4                     | 92 10                     | -74                       | +13                       | -            | -0.3         | +6.3 | -      |        |                                 |            |   |
| 12        | 52.6                      | 57 54                     | 269 41                    | 91 32                     | -73                       | +15                       | -            | -0.2         | +6.3 | -      |        |                                 |            |   |
| 13        | 52.6                      | 57 53                     | 270 19                    | 90 55                     | -73                       | +17                       | -            | -0.1         | +6.3 | -      |        |                                 |            |   |
| 14        | 52.7                      | 57 53                     | 270 57                    | 90 17                     | -73                       | +19                       | -            | +0.1         | +6.3 | -      |        |                                 |            |   |
| 15        | 52.7                      | 57 54                     | 271 35                    | 89 40                     | -72                       | +20                       | -            | +0.2         | +6.3 | -      |        |                                 |            |   |
| 16        | 52.8                      | 57 55                     | 272 13                    | 89 2                      | -72                       | +22                       | -            | +0.3         | +6.3 | -      |        |                                 |            |   |
| 17        | 52.8                      | 57 57                     | 272 51                    | 88 25                     | -72                       | +24                       | -            | +0.4         | +6.3 | -      |        |                                 |            |   |
| 18        | 52.9                      | 58 0                      | 273 28                    | 87 48                     | -71                       | +26                       | -            | +0.5         | +6.3 | -      |        |                                 |            |   |
| 19        | 52.9                      | 58 3                      | 274 6                     | 87 10                     | -71                       | +27                       | -            | +0.6         | +6.3 | -      |        |                                 |            |   |
| +20       | 4 53.0                    | 58 7                      | 274 43                    | 86 33                     | -70                       | +29                       | -            | +0.7         | +6.2 | -      |        |                                 |            |   |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| +0        | +0.05      | 0.0        | +0.3         | +0.4         |
| 5         | 0.05       | 0.0        | 0.3          | 0.4          |
| 10        | 0.06       | 0.0        | 0.3          | 0.4          |
| 15        | 0.06       | 0.0        | 0.3          | 0.4          |
| +20       | +0.06      | 0.0        | +0.3         | +0.4         |



TABLE II.

Pair No. 47  
 E 78 ζ Hydrae 3.3 8 52.8 +6 8  
 W 6 ε Piscium 4.5 1 0.3 +7 37

| φ   | S |      | z  |    | A <sub>E</sub> |    | A <sub>W</sub> |    | dz  | dA <sub>E</sub> | dA <sub>W</sub> | Var. for Δφ = +10' |                 |                 |     |   |
|-----|---|------|----|----|----------------|----|----------------|----|-----|-----------------|-----------------|--------------------|-----------------|-----------------|-----|---|
|     | h | m    | °  | '  | °              | '  | °              | '  |     |                 |                 | Δz                 | ΔA <sub>E</sub> | ΔA <sub>W</sub> |     |   |
| +0  | 4 | 56.3 | 59 | 55 | 262            | 55 | 98             | 49 | -74 | -               | 6               | +                  | -1.4            | +               | 5.7 | - |
| 1   |   | 56.4 | 59 | 47 | 263            | 29 | 98             | 15 | -74 | -               | 4               | +                  | -1.3            | +               | 5.8 | - |
| 2   |   | 56.5 | 59 | 40 | 264            | 4  | 97             | 40 | -75 | -               | 3               | +                  | -1.2            | +               | 5.8 | - |
| 3   |   | 56.5 | 59 | 33 | 264            | 39 | 97             | 5  | -75 | -               | 1               | +                  | -1.1            | +               | 5.9 | - |
| 4   |   | 56.6 | 59 | 27 | 265            | 14 | 96             | 30 | -75 | +               | 1               | -                  | -1.0            | +               | 5.9 | - |
| 5   |   | 56.6 | 59 | 21 | 265            | 50 | 95             | 55 | -75 | +               | 3               | -                  | -0.9            | +               | 5.9 | - |
| 6   |   | 56.7 | 59 | 16 | 266            | 25 | 95             | 19 | -75 | +               | 4               | -                  | -0.8            | +               | 6.0 | - |
| 7   |   | 56.8 | 59 | 12 | 267            | 1  | 94             | 44 | -74 | +               | 6               | -                  | -0.7            | +               | 6.0 | - |
| 8   |   | 56.8 | 59 | 8  | 267            | 37 | 94             | 8  | -74 | +               | 8               | -                  | -0.6            | +               | 6.0 | - |
| 9   |   | 56.9 | 59 | 5  | 268            | 13 | 93             | 32 | -74 | +               | 10              | -                  | -0.5            | +               | 6.0 | - |
| 10  |   | 57.0 | 59 | 2  | 268            | 49 | 92             | 57 | -74 | +               | 11              | -                  | -0.4            | +               | 6.0 | - |
| 11  |   | 57.0 | 59 | 1  | 269            | 25 | 92             | 21 | -74 | +               | 13              | -                  | -0.3            | +               | 6.0 | - |
| 12  |   | 57.1 | 58 | 59 | 269            | 1  | 91             | 45 | -73 | +               | 15              | -                  | -0.2            | +               | 6.0 | - |
| 13  |   | 57.1 | 58 | 59 | 270            | 37 | 91             | 9  | -73 | +               | 17              | -                  | -0.1            | +               | 6.0 | - |
| 14  |   | 57.2 | 58 | 59 | 271            | 14 | 90             | 33 | -73 | +               | 18              | -                  | +0.1            | +               | 6.1 | - |
| 15  |   | 57.3 | 58 | 59 | 271            | 50 | 89             | 57 | -72 | +               | 20              | -                  | +0.2            | +               | 6.1 | - |
| 16  |   | 57.3 | 59 | 1  | 272            | 26 | 89             | 22 | -72 | +               | 22              | -                  | +0.3            | +               | 6.1 | - |
| 17  |   | 57.4 | 59 | 3  | 273            | 3  | 88             | 46 | -72 | +               | 24              | -                  | +0.4            | +               | 6.0 | - |
| 18  |   | 57.5 | 59 | 5  | 273            | 39 | 88             | 10 | -71 | +               | 25              | -                  | +0.5            | +               | 6.0 | - |
| 19  |   | 57.5 | 59 | 8  | 274            | 15 | 87             | 35 | -71 | +               | 27              | -                  | +0.6            | +               | 6.0 | - |
| +20 | 4 | 57.6 | 59 | 12 | 274            | 51 | 86             | 59 | -70 | +               | 29              | -                  | +0.7            | +               | 6.0 | - |

Annual Precessions of S, z, A<sub>E</sub>, and A<sub>W</sub>.

| φ   | δS    | δz  | δA <sub>E</sub> | δA <sub>W</sub> |
|-----|-------|-----|-----------------|-----------------|
| 0   | m     | '   | '               | '               |
| +0  | +0.05 | 0.0 | +0.3            | +0.4            |
| 5   | 0.05  | 0.0 | 0.3             | 0.4             |
| 10  | 0.06  | 0.0 | 0.3             | 0.4             |
| 15  | 0.06  | 0.0 | 0.3             | 0.4             |
| +20 | +0.06 | 0.0 | +0.3            | +0.4            |

Pair No. 48  
 E 69 ι Geminor. 3.9 7 22.6 +27 54  
 W 24 41 Arietis 3.7 2 47.0 +27 3

| φ   | S |     | z  |    | A <sub>E</sub> |    | A <sub>W</sub> |    | dz  | dA <sub>E</sub> | dA <sub>W</sub> | Var. for Δφ = +10' |                 |                 |      |   |
|-----|---|-----|----|----|----------------|----|----------------|----|-----|-----------------|-----------------|--------------------|-----------------|-----------------|------|---|
|     | h | m   | °  | '  | °              | '  | °              | '  |     |                 |                 | Δz                 | ΔA <sub>E</sub> | ΔA <sub>W</sub> |      |   |
| +0  | 5 | 6.1 | 43 | 26 | 227            | 7  | 131            | 24 | -55 | -               | 54              | +                  | -6.7            | +               | 7.8  | - |
| 1   |   | 6.1 | 42 | 46 | 227            | 55 | 130            | 36 | -56 | -               | 54              | +                  | -6.6            | +               | 8.1  | - |
| 2   |   | 6.0 | 42 | 7  | 228            | 44 | 129            | 46 | -57 | -               | 53              | +                  | -6.5            | +               | 8.4  | - |
| 3   |   | 6.0 | 41 | 29 | 229            | 36 | 128            | 55 | -57 | -               | 52              | +                  | -6.4            | +               | 8.7  | - |
| 4   |   | 5.9 | 40 | 51 | 230            | 29 | 128            | 2  | -58 | -               | 51              | +                  | -6.3            | +               | 9.0  | - |
| 5   |   | 5.9 | 40 | 13 | 231            | 24 | 127            | 7  | -59 | -               | 49              | +                  | -6.2            | +               | 9.3  | - |
| 6   |   | 5.8 | 39 | 37 | 232            | 21 | 126            | 10 | -59 | -               | 48              | +                  | -6.0            | +               | 9.7  | - |
| 7   |   | 5.8 | 39 | 1  | 233            | 20 | 125            | 10 | -60 | -               | 46              | +                  | -5.9            | +               | 10.0 | - |
| 8   |   | 5.7 | 38 | 26 | 234            | 20 | 124            | 9  | -61 | -               | 45              | +                  | -5.7            | +               | 10.3 | - |
| 9   |   | 5.6 | 37 | 53 | 235            | 23 | 123            | 6  | -61 | -               | 43              | +                  | -5.6            | +               | 10.7 | - |
| 10  |   | 5.6 | 37 | 20 | 236            | 28 | 122            | 1  | -62 | -               | 41              | +                  | -5.4            | +               | 11.0 | - |
| 11  |   | 5.5 | 36 | 48 | 237            | 35 | 120            | 54 | -62 | -               | 39              | +                  | -5.3            | +               | 11.4 | - |
| 12  |   | 5.5 | 36 | 17 | 238            | 45 | 119            | 44 | -63 | -               | 37              | +                  | -5.1            | +               | 11.7 | - |
| 13  |   | 5.4 | 35 | 47 | 239            | 56 | 118            | 32 | -63 | -               | 34              | +                  | -4.9            | +               | 12.1 | - |
| 14  |   | 5.4 | 35 | 18 | 241            | 9  | 117            | 19 | -64 | -               | 32              | +                  | -4.7            | +               | 12.4 | - |
| 15  |   | 5.3 | 34 | 50 | 242            | 25 | 116            | 3  | -64 | -               | 29              | +                  | -4.5            | +               | 12.8 | - |
| 16  |   | 5.3 | 34 | 24 | 243            | 43 | 114            | 45 | -65 | -               | 26              | +                  | -4.3            | +               | 13.1 | - |
| 17  |   | 5.2 | 33 | 59 | 245            | 2  | 113            | 24 | -65 | -               | 23              | +                  | -4.1            | +               | 13.5 | - |
| 18  |   | 5.1 | 33 | 35 | 246            | 24 | 112            | 2  | -66 | -               | 20              | +                  | -3.9            | +               | 13.8 | - |
| 19  |   | 5.1 | 33 | 12 | 247            | 48 | 110            | 32 | -66 | -               | 16              | +                  | -3.7            | +               | 14.2 | - |
| +20 | 5 | 5.0 | 32 | 51 | 249            | 15 | 109            | 10 | -66 | -               | 13              | +                  | -3.6            | +               | 14.5 | - |

Annual Precessions of S, z, A<sub>E</sub>, and A<sub>W</sub>.

| φ   | δS    | δz   | δA <sub>E</sub> | δA <sub>W</sub> |
|-----|-------|------|-----------------|-----------------|
| 0   | m     | '    | '               | '               |
| +0  | +0.05 | +0.1 | +0.3            | +0.4            |
| 5   | 0.05  | +0.1 | 0.3             | 0.4             |
| 10  | 0.06  | 0.0  | 0.2             | 0.4             |
| 15  | 0.06  | 0.0  | 0.2             | 0.4             |
| +20 | +0.06 | 0.0  | +0.2            | +0.5            |



TABLE II.

Pair No. 49  
 E 81  $\alpha$  Lyncis 3.3  $\alpha_{1950}$  9 18.0  $\delta_{1950}$  +34 36  
 W 8  $\beta$  Androm. 2.4 1 6.9 +35 21

| $\varphi$ | S |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |      |   |
|-----------|---|------|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------|---|
|           | h | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | E    | W |
| +0        | 5 | 11.9 | 67 | 23 | 232   | 2  | 128   | 49 | -59 | -20    | +      | -6.2                            | +3.3 | - |
| 1         |   | 11.9 | 66 | 46 | 232   | 22 | 128   | 29 | -59 | -19    | +      | -6.2                            | +3.4 | - |
| 2         |   | 12.0 | 66 | 9  | 232   | 43 | 128   | 9  | -59 | -18    | +      | -6.1                            | +3.5 | - |
| 3         |   | 12.0 | 65 | 33 | 233   | 4  | 127   | 47 | -60 | -17    | +      | -6.1                            | +3.6 | - |
| 4         |   | 12.0 | 64 | 57 | 233   | 26 | 127   | 25 | -60 | -16    | +      | -6.0                            | +3.7 | - |
| 5         |   | 12.1 | 64 | 21 | 233   | 49 | 127   | 3  | -60 | -15    | +      | -6.0                            | +3.9 | - |
| 6         |   | 12.1 | 63 | 45 | 234   | 13 | 126   | 39 | -60 | -15    | +      | -5.9                            | +4.0 | - |
| 7         |   | 12.1 | 63 | 10 | 234   | 37 | 126   | 15 | -60 | -14    | +      | -5.9                            | +4.1 | - |
| 8         |   | 12.1 | 62 | 35 | 235   | 2  | 125   | 50 | -61 | -13    | +      | -5.8                            | +4.2 | - |
| 9         |   | 12.2 | 62 | 0  | 235   | 28 | 125   | 24 | -61 | -12    | +      | -5.7                            | +4.4 | - |
| 10        |   | 12.2 | 61 | 26 | 235   | 55 | 124   | 58 | -61 | -10    | +      | -5.7                            | +4.5 | - |
| 11        |   | 12.2 | 60 | 52 | 236   | 22 | 124   | 31 | -61 | -9     | +      | -5.6                            | +4.6 | - |
| 12        |   | 12.3 | 60 | 19 | 236   | 50 | 124   | 3  | -61 | -8     | +      | -5.5                            | +4.8 | - |
| 13        |   | 12.3 | 59 | 46 | 237   | 19 | 123   | 34 | -61 | -7     | +      | -5.5                            | +4.9 | - |
| 14        |   | 12.3 | 59 | 13 | 237   | 49 | 123   | 4  | -61 | -6     | +      | -5.4                            | +5.0 | - |
| 15        |   | 12.4 | 58 | 41 | 238   | 19 | 122   | 34 | -61 | -4     | +      | -5.3                            | +5.2 | - |
| 16        |   | 12.4 | 58 | 9  | 238   | 51 | 122   | 3  | -61 | -3     | +      | -5.2                            | +5.3 | - |
| 17        |   | 12.4 | 57 | 38 | 239   | 23 | 121   | 31 | -61 | -2     | +      | -5.2                            | +5.5 | - |
| 18        |   | 12.5 | 57 | 7  | 239   | 56 | 120   | 58 | -61 | -1     | +      | -5.1                            | +5.6 | - |
| 19        |   | 12.5 | 56 | 37 | 240   | 30 | 120   | 24 | -61 | +1     | -      | -5.0                            | +5.7 | - |
| +20       | 5 | 12.5 | 56 | 7  | 241   | 5  | 119   | 50 | -61 | +2     | -      | -4.9                            | +5.9 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| +0        | +0.05      | 0.0        | +0.3         | +0.4         |
| 5         | 0.05       | 0.0        | 0.3          | 0.4          |
| 10        | 0.06       | 0.0        | 0.3          | 0.4          |
| 15        | 0.06       | 0.0        | 0.3          | 0.4          |
| +20       | +0.06      | 0.0        | +0.3         | +0.4         |

DATA REQUIRED FOR OBSERVATION.

Pair No. 50  
 E 74 Bradley 1197 4.0  $\alpha_{1950}$  8 23.2  $\delta_{1950}$  -3 45  
 W 19  $\alpha$  Ceti 2.0-9.6 2 16.8 -3 12

| $\varphi$ | S |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |      |   |
|-----------|---|------|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------|---|
|           | h | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | E    | W |
| +0        | 5 | 20.1 | 46 | 31 | 275   | 10 | 85    | 35 | -75 | +6     | -      | +0.8                            | +9.5 | - |
| 1         |   | 20.1 | 46 | 37 | 276   | 7  | 84    | 39 | -75 | +9     | -      | +1.0                            | +9.4 | - |
| 2         |   | 20.1 | 46 | 43 | 277   | 3  | 83    | 42 | -75 | +11    | -      | +1.2                            | +9.3 | - |
| 3         |   | 20.1 | 46 | 51 | 277   | 59 | 82    | 47 | -74 | +14    | -      | +1.3                            | +9.3 | - |
| 4         |   | 20.2 | 46 | 59 | 278   | 54 | 81    | 51 | -74 | +16    | -      | +1.5                            | +9.2 | - |
| 5         |   | 20.2 | 47 | 8  | 279   | 49 | 80    | 56 | -74 | +18    | -      | +1.6                            | +9.1 | - |
| 6         |   | 20.2 | 47 | 19 | 280   | 44 | 80    | 1  | -73 | +21    | -      | +1.8                            | +9.1 | - |
| 7         |   | 20.2 | 47 | 30 | 281   | 38 | 79    | 7  | -73 | +23    | -      | +2.0                            | +9.0 | - |
| 8         |   | 20.3 | 47 | 42 | 282   | 32 | 78    | 14 | -73 | +25    | -      | +2.1                            | +8.9 | - |
| 9         |   | 20.3 | 47 | 55 | 283   | 25 | 77    | 21 | -72 | +28    | -      | +2.3                            | +8.8 | - |
| 10        |   | 20.3 | 48 | 9  | 284   | 18 | 76    | 28 | -72 | +30    | -      | +2.4                            | +8.7 | - |
| 11        |   | 20.3 | 48 | 24 | 285   | 9  | 75    | 36 | -71 | +32    | -      | +2.6                            | +8.6 | - |
| 12        |   | 20.4 | 48 | 40 | 286   | 1  | 74    | 45 | -71 | +34    | -      | +2.7                            | +8.5 | - |
| 13        |   | 20.4 | 48 | 56 | 286   | 51 | 73    | 55 | -70 | +36    | -      | +2.8                            | +8.4 | - |
| 14        |   | 20.4 | 49 | 14 | 287   | 41 | 73    | 5  | -69 | +38    | -      | +3.0                            | +8.3 | - |
| 15        |   | 20.5 | 49 | 32 | 288   | 30 | 72    | 16 | -69 | +39    | -      | +3.1                            | +8.1 | - |
| 16        |   | 20.5 | 49 | 51 | 289   | 19 | 71    | 28 | -68 | +41    | -      | +3.2                            | +8.0 | - |
| 17        |   | 20.5 | 50 | 11 | 290   | 6  | 70    | 41 | -67 | +43    | -      | +3.4                            | +7.9 | - |
| 18        |   | 20.5 | 50 | 31 | 290   | 53 | 69    | 54 | -67 | +45    | -      | +3.5                            | +7.7 | - |
| 19        |   | 20.6 | 50 | 53 | 291   | 39 | 69    | 8  | -66 | +46    | -      | +3.6                            | +7.6 | - |
| +20       | 5 | 20.6 | 51 | 15 | 292   | 24 | 68    | 24 | -65 | +48    | -      | +3.8                            | +7.5 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| +0        | +0.05      | 0.0        | +0.3         | +0.4         |
| 5         | 0.05       | 0.0        | 0.3          | 0.4          |
| 10        | 0.06       | 0.0        | 0.3          | 0.4          |
| 15        | 0.06       | 0.0        | 0.3          | 0.4          |
| +20       | +0.06      | 0.0        | +0.3         | +0.4         |



TABLE II.

| No.  | Star           | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|------|----------------|------|---------------------------|---------------------------|
|      |                |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| E 73 | $\beta$ Cancri | 3.8  | 8 13.8                    | +9 20                     |
| W 23 | $\mu$ Ceti     | 4.4  | 2 42.2                    | +9 54                     |

| $\phi$ | S                         |                           | z                         |                           | $A_E$                     |                           | $A_W$      |              | dz   | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |  |  |
|--------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|------------|--------------|------|--------|--------|------------------------------|--|--|
|        | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | $\Delta z$ | $\Delta A_E$ |      |        |        | $\Delta A_W$                 |  |  |
| +0     | 5 27.8                    | 42 57                     | 256 14                    | 104 37                    | -73                       | -                         | 20         | +            | -2.5 | +10.4  | -      |                              |  |  |
| 1      | 27.8                      | 42 43                     | 257 17                    | 103 35                    | -73                       | -                         | 18         | +            | -2.3 | +10.5  | -      |                              |  |  |
| 2      | 27.9                      | 42 30                     | 258 20                    | 102 31                    | -73                       | -                         | 15         | +            | -2.1 | +10.7  | -      |                              |  |  |
| 3      | 27.9                      | 42 18                     | 259 25                    | 101 27                    | -74                       | -                         | 12         | +            | -1.9 | +10.8  | -      |                              |  |  |
| 4      | 27.9                      | 42 7                      | 260 30                    | 100 22                    | -74                       | -                         | 10         | +            | -1.7 | +10.9  | -      |                              |  |  |
| 5      | 28.0                      | 41 58                     | 261 35                    | 99 16                     | -74                       | -                         | 7          | +            | -1.5 | +11.0  | -      |                              |  |  |
| 6      | 28.0                      | 41 49                     | 262 42                    | 98 10                     | -74                       | -                         | 4          | +            | -1.4 | +11.1  | -      |                              |  |  |
| 7      | 28.0                      | 41 41                     | 263 48                    | 97 3                      | -74                       | -                         | 1          | +            | -1.2 | +11.2  | -      |                              |  |  |
| 8      | 28.0                      | 41 35                     | 264 56                    | 95 56                     | -74                       | +                         | 2          | -            | -1.0 | +11.2  | -      |                              |  |  |
| 9      | 28.1                      | 41 30                     | 266 3                     | 94 49                     | -74                       | +                         | 5          | -            | -0.8 | +11.3  | -      |                              |  |  |
| 10     | 28.1                      | 41 26                     | 267 11                    | 93 41                     | -74                       | +                         | 8          | -            | -0.6 | +11.3  | -      |                              |  |  |
| 11     | 28.1                      | 41 23                     | 268 19                    | 92 33                     | -74                       | +                         | 11         | -            | -0.4 | +11.4  | -      |                              |  |  |
| 12     | 28.2                      | 41 21                     | 269 27                    | 91 25                     | -73                       | +                         | 14         | -            | -0.2 | +11.4  | -      |                              |  |  |
| 13     | 28.2                      | 41 21                     | 270 35                    | 90 17                     | -73                       | +                         | 17         | -            | 0.0  | +11.4  | -      |                              |  |  |
| 14     | 28.2                      | 41 22                     | 271 43                    | 89 9                      | -73                       | +                         | 20         | -            | +0.2 | +11.4  | -      |                              |  |  |
| 15     | 28.3                      | 41 24                     | 272 52                    | 88 1                      | -72                       | +                         | 23         | -            | +0.4 | +11.4  | -      |                              |  |  |
| 16     | 28.3                      | 41 27                     | 274 0                     | 86 53                     | -72                       | +                         | 26         | -            | +0.6 | +11.3  | -      |                              |  |  |
| 17     | 28.3                      | 41 31                     | 275 8                     | 85 46                     | -72                       | +                         | 29         | -            | +0.8 | +11.3  | -      |                              |  |  |
| 18     | 28.4                      | 41 37                     | 276 15                    | 84 39                     | -71                       | +                         | 32         | -            | +1.0 | +11.2  | -      |                              |  |  |
| 19     | 28.4                      | 41 43                     | 277 22                    | 83 32                     | -70                       | +                         | 35         | -            | +1.2 | +11.2  | -      |                              |  |  |
| +20    | 5 28.4                    | 41 51                     | 278 29                    | 82 25                     | -70                       | +                         | 37         | -            | +1.4 | +11.1  | -      |                              |  |  |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$       | $\delta S$   | $\delta z$   | $\delta A_E$ | $\delta A_W$ |
|--------------|--------------|--------------|--------------|--------------|
| <sup>°</sup> | <sup>m</sup> | <sup>'</sup> | <sup>'</sup> | <sup>'</sup> |
| +0           | +0.05        | 0.0          | +0.3         | +0.4         |
| 5            | 0.05         | 0.0          | 0.3          | 0.4          |
| 10           | 0.06         | 0.0          | 0.3          | 0.4          |
| 15           | 0.06         | 0.0          | 0.3          | 0.4          |
| +20          | +0.06        | 0.0          | +0.3         | +0.4         |

DATA REQUIRED FOR OBSERVATION.

| No.  | Star              | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|------|-------------------|------|---------------------------|---------------------------|
|      |                   |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| E 81 | $\alpha$ Lyncis   | 3.3  | 9 18.0                    | +34 36                    |
| W 18 | $\beta$ Trianguli | 3.1  | 2 6.6                     | +34 45                    |

| $\phi$ | S                         |                           | z                         |                           | $A_E$                     |                           | $A_W$      |              | dz   | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |  |  |
|--------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|------------|--------------|------|--------|--------|------------------------------|--|--|
|        | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | $\Delta z$ | $\Delta A_E$ |      |        |        | $\Delta A_W$                 |  |  |
| +0     | 5 42.1                    | 61 31                     | 229 45                    | 130 26                    | -57                       | -                         | 27         | +            | -6.5 | +4.1   | -      |                              |  |  |
| 1      | 42.2                      | 60 52                     | 230 10                    | 130 0                     | -57                       | -                         | 26         | +            | -6.4 | +4.3   | -      |                              |  |  |
| 2      | 42.2                      | 60 14                     | 230 36                    | 129 34                    | -58                       | -                         | 25         | +            | -6.4 | +4.4   | -      |                              |  |  |
| 3      | 42.2                      | 59 36                     | 231 3                     | 129 8                     | -58                       | -                         | 24         | +            | -6.3 | +4.6   | -      |                              |  |  |
| 4      | 42.2                      | 58 59                     | 231 31                    | 128 40                    | -59                       | -                         | 23         | +            | -6.2 | +4.7   | -      |                              |  |  |
| 5      | 42.2                      | 58 21                     | 232 0                     | 128 11                    | -59                       | -                         | 22         | +            | -6.2 | +4.9   | -      |                              |  |  |
| 6      | 42.2                      | 57 45                     | 232 29                    | 127 42                    | -59                       | -                         | 21         | +            | -6.1 | +5.0   | -      |                              |  |  |
| 7      | 42.2                      | 57 8                      | 233 0                     | 127 11                    | -59                       | -                         | 20         | +            | -6.0 | +5.2   | -      |                              |  |  |
| 8      | 42.2                      | 56 32                     | 233 31                    | 126 40                    | -60                       | -                         | 19         | +            | -6.0 | +5.3   | -      |                              |  |  |
| 9      | 42.2                      | 55 57                     | 234 4                     | 126 7                     | -60                       | -                         | 18         | +            | -5.9 | +5.5   | -      |                              |  |  |
| 10     | 42.2                      | 55 22                     | 234 37                    | 125 34                    | -60                       | -                         | 17         | +            | -5.8 | +5.6   | -      |                              |  |  |
| 11     | 42.2                      | 54 47                     | 235 11                    | 125 0                     | -60                       | -                         | 16         | +            | -5.7 | +5.8   | -      |                              |  |  |
| 12     | 42.2                      | 54 13                     | 235 46                    | 124 25                    | -60                       | -                         | 15         | +            | -5.6 | +6.0   | -      |                              |  |  |
| 13     | 42.2                      | 53 39                     | 236 23                    | 123 48                    | -61                       | -                         | 14         | +            | -5.6 | +6.1   | -      |                              |  |  |
| 14     | 42.2                      | 53 6                      | 237 0                     | 123 11                    | -61                       | -                         | 12         | +            | -5.5 | +6.3   | -      |                              |  |  |
| 15     | 42.2                      | 52 34                     | 237 38                    | 122 33                    | -61                       | -                         | 11         | +            | -5.4 | +6.5   | -      |                              |  |  |
| 16     | 42.3                      | 52 2                      | 238 18                    | 121 54                    | -61                       | -                         | 10         | +            | -5.3 | +6.6   | -      |                              |  |  |
| 17     | 42.3                      | 51 31                     | 238 58                    | 121 14                    | -61                       | -                         | 8          | +            | -5.2 | +6.8   | -      |                              |  |  |
| 18     | 42.3                      | 51 0                      | 239 39                    | 120 32                    | -61                       | -                         | 7          | +            | -5.1 | +7.0   | -      |                              |  |  |
| 19     | 42.3                      | 50 30                     | 240 22                    | 119 50                    | -62                       | -                         | 5          | +            | -5.0 | +7.2   | -      |                              |  |  |
| +20    | 5 42.3                    | 50 0                      | 241 5                     | 119 6                     | -62                       | -                         | 4          | +            | -4.9 | +7.2   | -      |                              |  |  |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$       | $\delta S$   | $\delta z$   | $\delta A_E$ | $\delta A_W$ |
|--------------|--------------|--------------|--------------|--------------|
| <sup>°</sup> | <sup>m</sup> | <sup>'</sup> | <sup>'</sup> | <sup>'</sup> |
| +0           | +0.05        | 0.0          | +0.3         | +0.3         |
| 5            | 0.05         | 0.0          | 0.3          | 0.3          |
| 10           | 0.06         | 0.0          | 0.3          | 0.4          |
| 15           | 0.06         | 0.0          | 0.3          | 0.4          |
| +20          | +0.06        | 0.0          | +0.3         | +0.4         |



TABLE 11.

| Pair No. | E | No. | Star           | Mag. | $\alpha_{1950}$ |      | $\delta_{1950}$ |    |
|----------|---|-----|----------------|------|-----------------|------|-----------------|----|
|          |   |     |                |      | h               | m    | °               | '  |
| 53       | E | 73  | $\beta$ Caneri | 3.8  | 8               | 13.8 | +9              | 20 |
|          | W | 28  | $\xi$ Tauri    | 3.8  | 3               | 24.5 | +9              | 34 |

| $\varphi$ | S |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |       |   |
|-----------|---|------|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------------|-------|---|
|           | h | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | $\Delta A$ |       |   |
|           |   |      |    |    |       |    |       |    |     |        |        | E                               | W          |       |   |
| +0        | 5 | 49.0 | 37 | 49 | 254   | 39 | 105   | 43 | -72 | -      | 27     | +                               | -2.7       | +12.4 | - |
| 1         |   | 49.0 | 37 | 34 | 255   | 54 | 104   | 28 | -73 | -      | 24     | +                               | -2.5       | +12.6 | - |
| 2         |   | 49.1 | 37 | 20 | 257   | 11 | 103   | 12 | -73 | -      | 20     | +                               | -2.3       | +12.8 | - |
| 3         |   | 49.1 | 37 | 7  | 258   | 28 | 101   | 55 | -73 | -      | 17     | +                               | -2.0       | +12.9 | - |
| 4         |   | 49.1 | 36 | 55 | 259   | 46 | 100   | 37 | -74 | -      | 13     | +                               | -1.8       | +13.1 | - |
| 5         |   | 49.1 | 36 | 45 | 261   | 5  | 99    | 18 | -74 | -      | 10     | +                               | -1.6       | +13.2 | - |
| 6         |   | 49.1 | 36 | 36 | 262   | 25 | 97    | 58 | -74 | -      | 6      | +                               | -1.4       | +13.3 | - |
| 7         |   | 49.1 | 36 | 29 | 263   | 45 | 96    | 38 | -74 | -      | 3      | +                               | -1.1       | +13.4 | - |
| 8         |   | 49.1 | 36 | 23 | 265   | 6  | 95    | 17 | -74 | +      | 1      | -                               | -0.9       | +13.5 | - |
| 9         |   | 49.2 | 36 | 18 | 266   | 27 | 93    | 56 | -74 | +      | 5      | -                               | -0.7       | +13.6 | - |
| 10        |   | 49.2 | 36 | 15 | 267   | 49 | 92    | 34 | -74 | +      | 9      | -                               | -0.4       | +13.6 | - |
| 11        |   | 49.2 | 36 | 13 | 269   | 11 | 91    | 12 | -74 | +      | 13     | -                               | -0.2       | +13.7 | - |
| 12        |   | 49.2 | 36 | 13 | 270   | 32 | 89    | 50 | -73 | +      | 16     | -                               | +0.1       | +13.6 | - |
| 13        |   | 49.2 | 36 | 14 | 271   | 54 | 88    | 29 | -73 | +      | 20     | -                               | +0.3       | +13.6 | - |
| 14        |   | 49.2 | 36 | 17 | 273   | 16 | 87    | 7  | -73 | +      | 24     | -                               | +0.5       | +13.6 | - |
| 15        |   | 49.2 | 36 | 20 | 274   | 38 | 85    | 45 | -72 | +      | 28     | -                               | +0.8       | +13.6 | - |
| 16        |   | 49.2 | 36 | 26 | 275   | 59 | 84    | 24 | -72 | +      | 31     | -                               | +1.0       | +13.5 | - |
| 17        |   | 49.3 | 36 | 32 | 277   | 20 | 83    | 4  | -71 | +      | 35     | -                               | +1.2       | +13.4 | - |
| 18        |   | 49.3 | 36 | 41 | 278   | 39 | 81    | 44 | -71 | +      | 38     | -                               | +1.5       | +13.3 | - |
| 19        |   | 49.3 | 36 | 50 | 279   | 59 | 80    | 25 | -70 | +      | 41     | -                               | +1.7       | +13.2 | - |
| +20       | 5 | 49.3 | 37 | 1  | 281   | 17 | 79    | 6  | -69 | +      | 45     | -                               | +1.9       | +13.1 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| °         | m          | '          | '            | '            |
| +0        | +0.05      | 0.0        | +0.3         | +0.4         |
| 5         | 0.05       | 0.0        | 0.3          | 0.4          |
| 10        | 0.06       | 0.0        | 0.3          | 0.4          |
| 15        | 0.06       | 0.0        | 0.3          | 0.4          |
| +20       | +0.06      | 0.0        | +0.3         | +0.4         |

DATA REQUIRED FOR OBSERVATION.

| Pair No. | E | No. | Star            | Mag. | $\alpha_{1950}$ |      | $\delta_{1950}$ |    |
|----------|---|-----|-----------------|------|-----------------|------|-----------------|----|
|          |   |     |                 |      | h               | m    | °               | '  |
| 54       | E | 80  | $\theta$ Hydræ  | 3.8  | 9               | 11.8 | +2              | 32 |
|          | W | 21  | $\gamma^2$ Ceti | 3.7  | 2               | 40.7 | +3              | 2  |

| $\varphi$ | S |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |      |   |
|-----------|---|------|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------------|------|---|
|           | h | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | $\Delta A$ |      |   |
|           |   |      |    |    |       |    |       |    |     |        |        | E                               | W          |      |   |
| +0        | 5 | 56.2 | 49 | 34 | 266   | 41 | 93    | 59 | -75 | -      | 4      | +                               | -0.6       | +8.5 | - |
| 1         |   | 56.2 | 49 | 30 | 267   | 32 | 93    | 8  | -75 | -      | 2      | +                               | -0.5       | +8.5 | - |
| 2         |   | 56.3 | 49 | 28 | 268   | 23 | 92    | 17 | -75 | +      | 1      | -                               | -0.3       | +8.5 | - |
| 3         |   | 56.3 | 49 | 26 | 269   | 15 | 91    | 25 | -75 | +      | 3      | -                               | -0.2       | +8.6 | - |
| 4         |   | 56.3 | 49 | 26 | 270   | 6  | 90    | 34 | -75 | +      | 5      | -                               | 0.0        | +8.6 | - |
| 5         |   | 56.3 | 49 | 26 | 270   | 57 | 89    | 43 | -75 | +      | 7      | -                               | +0.1       | +8.6 | - |
| 6         |   | 56.3 | 49 | 27 | 271   | 49 | 88    | 51 | -75 | +      | 10     | -                               | +0.2       | +8.6 | - |
| 7         |   | 56.4 | 49 | 29 | 272   | 40 | 88    | 0  | -74 | +      | 12     | -                               | +0.3       | +8.6 | - |
| 8         |   | 56.4 | 49 | 32 | 273   | 31 | 87    | 9  | -74 | +      | 14     | -                               | +0.5       | +8.5 | - |
| 9         |   | 56.4 | 49 | 36 | 274   | 22 | 86    | 18 | -74 | +      | 16     | -                               | +0.6       | +8.5 | - |
| 10        |   | 56.4 | 49 | 40 | 275   | 13 | 85    | 27 | -74 | +      | 19     | -                               | +0.7       | +8.5 | - |
| 11        |   | 56.5 | 49 | 46 | 276   | 4  | 84    | 37 | -73 | +      | 21     | -                               | +0.8       | +8.4 | - |
| 12        |   | 56.5 | 49 | 52 | 276   | 54 | 83    | 46 | -73 | +      | 23     | -                               | +1.0       | +8.4 | - |
| 13        |   | 56.5 | 50 | 0  | 277   | 45 | 82    | 56 | -72 | +      | 25     | -                               | +1.1       | +8.3 | - |
| 14        |   | 56.5 | 50 | 8  | 278   | 34 | 82    | 7  | -72 | +      | 27     | -                               | +1.2       | +8.3 | - |
| 15        |   | 56.6 | 50 | 17 | 279   | 24 | 81    | 17 | -71 | +      | 29     | -                               | +1.3       | +8.2 | - |
| 16        |   | 56.6 | 50 | 27 | 280   | 13 | 80    | 29 | -71 | +      | 31     | -                               | +1.4       | +8.2 | - |
| 17        |   | 56.6 | 50 | 37 | 281   | 2  | 79    | 40 | -70 | +      | 33     | -                               | +1.5       | +8.1 | - |
| 18        |   | 56.6 | 50 | 49 | 281   | 50 | 78    | 52 | -70 | +      | 35     | -                               | +1.7       | +8.0 | - |
| 19        |   | 56.7 | 51 | 1  | 282   | 38 | 78    | 4  | -69 | +      | 37     | -                               | +1.8       | +7.9 | - |
| +20       | 5 | 56.7 | 51 | 14 | 283   | 25 | 77    | 17 | -68 | +      | 39     | -                               | +1.9       | +7.9 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| °         | m          | '          | '            | '            |
| +0        | +0.05      | 0.0        | +0.3         | +0.3         |
| 5         | 0.05       | 0.0        | 0.3          | 0.3          |
| 10        | 0.06       | 0.0        | 0.3          | 0.3          |
| 15        | 0.06       | 0.0        | 0.3          | 0.3          |
| +20       | +0.06      | 0.0        | +0.4         | +0.4         |



TABLE II.

|             | No.  | Star            | Mag. | $\alpha_{1950}$ | $\delta_{1950}$ |
|-------------|------|-----------------|------|-----------------|-----------------|
| Pair No. 55 | E 80 | $\theta$ Hydrae | 3.8  | 9 11.8          | +2 32           |
|             | W 26 | $\alpha$ Ceti   | 2.8  | 2 59.7          | +3 54           |

| $\varphi$ | S |     | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |      |   |     |   |
|-----------|---|-----|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------|---|-----|---|
|           | h | m   | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | E    | W |     |   |
| +0        | 6 | 5.6 | 47 | 13 | 266   | 34 | 95    | 19 | -75 | -      | 5      | +                               | -0.8 | + | 9.3 | - |
| 1         |   | 5.6 | 47 | 9  | 267   | 30 | 94    | 24 | -75 | -      | 3      | +                               | -0.6 | + | 9.3 | - |
| 2         |   | 5.7 | 47 | 6  | 268   | 25 | 93    | 28 | -75 |        | 0      |                                 | -0.4 | + | 9.3 | - |
| 3         |   | 5.8 | 47 | 4  | 269   | 21 | 92    | 32 | -75 | +      | 2      | -                               | -0.3 | + | 9.3 | - |
| 4         |   | 5.8 | 47 | 3  | 270   | 17 | 91    | 37 | -75 | +      | 5      | -                               | -0.1 | + | 9.3 | - |
| 5         |   | 5.9 | 47 | 3  | 271   | 13 | 90    | 41 | -75 | +      | 7      | -                               | +0.1 | + | 9.3 | - |
| 6         |   | 6.0 | 47 | 3  | 272   | 9  | 89    | 45 | -75 | +      | 10     | -                               | +0.2 | + | 9.3 | - |
| 7         |   | 6.0 | 47 | 5  | 273   | 5  | 88    | 49 | -74 | +      | 12     | -                               | +0.4 | + | 9.3 | - |
| 8         |   | 6.1 | 47 | 8  | 274   | 0  | 87    | 54 | -74 | +      | 14     | -                               | +0.5 | + | 9.3 | - |
| 9         |   | 6.2 | 47 | 11 | 274   | 56 | 86    | 59 | -74 | +      | 17     | -                               | +0.7 | + | 9.3 | - |
| 10        |   | 6.2 | 47 | 16 | 275   | 52 | 86    | 3  | -74 | +      | 19     | -                               | +0.9 | + | 9.2 | - |
| 11        |   | 6.3 | 47 | 22 | 276   | 47 | 85    | 8  | -73 | +      | 22     | -                               | +1.0 | + | 9.2 | - |
| 12        |   | 6.4 | 47 | 28 | 277   | 42 | 84    | 14 | -73 | +      | 24     | -                               | +1.2 | + | 9.1 | - |
| 13        |   | 6.4 | 47 | 36 | 278   | 37 | 83    | 20 | -72 | +      | 26     | -                               | +1.3 | + | 9.1 | - |
| 14        |   | 6.5 | 47 | 44 | 279   | 31 | 82    | 26 | -72 | +      | 28     | -                               | +1.5 | + | 9.0 | - |
| 15        |   | 6.6 | 47 | 54 | 280   | 25 | 81    | 32 | -71 | +      | 31     | -                               | +1.6 | + | 9.0 | - |
| 16        |   | 6.6 | 48 | 4  | 281   | 19 | 80    | 39 | -71 | +      | 33     | -                               | +1.8 | + | 8.9 | - |
| 17        |   | 6.7 | 48 | 15 | 282   | 12 | 79    | 47 | -70 | +      | 35     | -                               | +1.9 | + | 8.8 | - |
| 18        |   | 6.8 | 48 | 27 | 283   | 4  | 78    | 55 | -70 | +      | 37     | -                               | +2.1 | + | 8.7 | - |
| 19        |   | 6.9 | 48 | 40 | 283   | 56 | 78    | 4  | -69 | +      | 39     | -                               | +2.2 | + | 8.6 | - |
| +20       | 6 | 6.9 | 48 | 54 | 284   | 48 | 77    | 13 | -68 | +      | 41     | -                               | +2.4 | + | 8.5 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| °         | m          | '          | '            | '            |
| +0        | +0.05      | 0.0        | +0.3         | +0.3         |
| 5         | 0.05       | 0.0        | 0.3          | 0.3          |
| 10        | 0.06       | 0.0        | 0.4          | 0.3          |
| 15        | 0.06       | 0.0        | 0.4          | 0.3          |
| +20       | +0.06      | 0.0        | +0.4         | +0.3         |

DATA REQUIRED FOR OBSERVATION.

|             | No.  | Star            | Mag. | $\alpha_{1950}$ | $\delta_{1950}$ |
|-------------|------|-----------------|------|-----------------|-----------------|
| Pair No. 56 | E 79 | $\alpha$ Cancri | 4.3  | 8 55.8          | +12 3           |
|             | W 29 | $\delta$ Tauri  | 4.3  | 3 28.1          | +12 46          |

| $\varphi$ | S |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |      |   |      |   |
|-----------|---|------|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------|---|------|---|
|           | h | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | E    | W |      |   |
| +0        | 6 | 11.6 | 43 | 4  | 252   | 12 | 108   | 53 | -71 | -      | 26     | +                               | -3.2 | + | 10.1 | - |
| 1         |   | 11.6 | 42 | 46 | 253   | 14 | 107   | 52 | -72 | -      | 24     | +                               | -3.0 | + | 10.3 | - |
| 2         |   | 11.7 | 42 | 28 | 254   | 16 | 106   | 49 | -72 | -      | 21     | +                               | -2.8 | + | 10.5 | - |
| 3         |   | 11.7 | 42 | 12 | 255   | 20 | 105   | 46 | -72 | -      | 19     | +                               | -2.6 | + | 10.6 | - |
| 4         |   | 11.7 | 41 | 57 | 256   | 24 | 104   | 42 | -73 | -      | 16     | +                               | -2.4 | + | 10.8 | - |
| 5         |   | 11.8 | 41 | 43 | 257   | 29 | 103   | 37 | -73 | -      | 13     | +                               | -2.3 | + | 11.0 | - |
| 6         |   | 11.8 | 41 | 30 | 258   | 35 | 102   | 31 | -73 | -      | 10     | +                               | -2.1 | + | 11.1 | - |
| 7         |   | 11.8 | 41 | 18 | 259   | 42 | 101   | 24 | -73 | -      | 7      | +                               | -1.9 | + | 11.2 | - |
| 8         |   | 11.9 | 41 | 7  | 260   | 49 | 100   | 17 | -73 | -      | 4      | +                               | -1.7 | + | 11.3 | - |
| 9         |   | 11.9 | 40 | 58 | 261   | 57 | 99    | 9  | -73 | -      | 1      | +                               | -1.5 | + | 11.4 | - |
| 10        |   | 12.0 | 40 | 49 | 263   | 6  | 98    | 0  | -73 | +      | 2      | -                               | -1.3 | + | 11.5 | - |
| 11        |   | 12.0 | 40 | 42 | 264   | 15 | 96    | 51 | -73 | +      | 5      | -                               | -1.1 | + | 11.6 | - |
| 12        |   | 12.0 | 40 | 36 | 265   | 25 | 95    | 42 | -73 | +      | 8      | -                               | -0.9 | + | 11.6 | - |
| 13        |   | 12.1 | 40 | 31 | 266   | 35 | 94    | 32 | -73 | +      | 11     | -                               | -0.7 | + | 11.7 | - |
| 14        |   | 12.1 | 40 | 28 | 267   | 45 | 93    | 22 | -73 | +      | 14     | -                               | -0.5 | + | 11.7 | - |
| 15        |   | 12.2 | 40 | 25 | 268   | 56 | 92    | 12 | -72 | +      | 17     | -                               | -0.3 | + | 11.8 | - |
| 16        |   | 12.2 | 40 | 24 | 270   | 6  | 91    | 2  | -72 | +      | 20     | -                               | -0.1 | + | 11.8 | - |
| 17        |   | 12.2 | 40 | 25 | 271   | 17 | 89    | 51 | -72 | +      | 23     | -                               | +0.1 | + | 11.8 | - |
| 18        |   | 12.3 | 40 | 26 | 272   | 28 | 88    | 41 | -71 | +      | 26     | -                               | +0.3 | + | 11.8 | - |
| 19        |   | 12.3 | 40 | 28 | 273   | 38 | 87    | 31 | -71 | +      | 29     | -                               | +0.5 | + | 11.7 | - |
| +20       | 6 | 12.4 | 40 | 32 | 274   | 48 | 86    | 21 | -70 | +      | 32     | -                               | +0.7 | + | 11.7 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| °         | m          | '          | '            | '            |
| +0        | +0.05      | 0.0        | +0.4         | +0.3         |
| 5         | 0.05       | 0.0        | 0.4          | 0.3          |
| 10        | 0.06       | 0.0        | 0.4          | 0.3          |
| 15        | 0.06       | 0.0        | 0.4          | 0.3          |
| +20       | +0.06      | 0.0        | +0.4         | +0.3         |



TABLE II.

|             |   | No. | Star         | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|---|-----|--------------|------|---------------------------|---------------------------|
|             |   |     |              |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 57 | E | 85  | $\mu$ Leonis | 4.1  | 9 49.9                    | +26 15                    |
|             | W | 24  | 41 Arietis   | 3.7  | 2 47.0                    | +27 3                     |

| $\varphi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |       |   |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|---------------------------------|------------|-------|---|
|           | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                      | $\Delta A$ |       |   |
|           |              |              |              |              |              |              |              |              |     |        |        | E                               | W          |       |   |
| + 0       | 6            | 17.9         | 57           | 52           | 238          | 32           | 122          | 29           | -63 | -      | 26     | +                               | -5.3       | + 5.3 | - |
| 1         |              | 17.9         | 57           | 21           | 239          | 4            | 121          | 57           | -64 | -      | 24     | +                               | -5.2       | + 5.5 | - |
| 2         |              | 17.9         | 56           | 50           | 239          | 38           | 121          | 24           | -64 | -      | 23     | +                               | -5.1       | + 5.6 | - |
| 3         |              | 18.0         | 56           | 19           | 240          | 12           | 120          | 50           | -65 | -      | 22     | +                               | -5.0       | + 5.8 | - |
| 4         |              | 18.0         | 55           | 48           | 240          | 47           | 120          | 15           | -65 | -      | 21     | +                               | -5.0       | + 5.9 | - |
| 5         |              | 18.0         | 55           | 20           | 241          | 22           | 119          | 39           | -65 | -      | 19     | +                               | -4.9       | + 6.1 | - |
| 6         |              | 18.1         | 54           | 51           | 241          | 59           | 119          | 2            | -66 | -      | 18     | +                               | -4.8       | + 6.2 | - |
| 7         |              | 18.1         | 54           | 22           | 242          | 37           | 118          | 25           | -66 | -      | 16     | +                               | -4.7       | + 6.3 | - |
| 8         |              | 18.2         | 53           | 55           | 243          | 15           | 117          | 47           | -66 | -      | 15     | +                               | -4.6       | + 6.5 | - |
| 9         |              | 18.2         | 53           | 28           | 243          | 55           | 117          | 7            | -66 | -      | 13     | +                               | -4.5       | + 6.6 | - |
| 10        |              | 18.2         | 53           | 1            | 244          | 35           | 116          | 27           | -66 | -      | 12     | +                               | -4.4       | + 6.8 | - |
| 11        |              | 18.3         | 52           | 35           | 245          | 16           | 115          | 46           | -67 | -      | 10     | +                               | -4.3       | + 6.9 | - |
| 12        |              | 18.3         | 52           | 10           | 245          | 58           | 115          | 4            | -67 | -      | 9      | +                               | -4.2       | + 7.1 | - |
| 13        |              | 18.3         | 51           | 45           | 246          | 41           | 114          | 22           | -67 | -      | 7      | +                               | -4.0       | + 7.2 | - |
| 14        |              | 18.4         | 51           | 21           | 247          | 25           | 113          | 38           | -67 | -      | 5      | +                               | -3.9       | + 7.4 | - |
| 15        |              | 18.4         | 50           | 58           | 248          | 10           | 112          | 54           | -67 | -      | 3      | +                               | -3.8       | + 7.5 | - |
| 16        |              | 18.5         | 50           | 36           | 248          | 55           | 112          | 8            | -67 | -      | 2      | +                               | -3.7       | + 7.7 | - |
| 17        |              | 18.5         | 50           | 14           | 249          | 42           | 111          | 22           | -67 |        | 0      |                                 | -3.6       | + 7.8 | - |
| 18        |              | 18.5         | 49           | 53           | 250          | 29           | 110          | 35           | -67 | +      | 2      | -                               | -3.4       | + 7.9 | - |
| 19        |              | 18.6         | 49           | 33           | 251          | 17           | 109          | 48           | -67 | +      | 4      | -                               | -3.3       | + 8.1 | - |
| +20       | 6            | 18.6         | 49           | 13           | 252          | 6            | 108          | 59           | -67 | +      | 6      | -                               | -3.2       | + 8.2 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| °         | m          | '          | '            | '            |
| + 0       | +0.05      | 0.0        | +0.3         | +0.3         |
| 5         | 0.05       | 0.0        | 0.4          | 0.3          |
| 10        | 0.06       | 0.0        | 0.4          | 0.3          |
| 15        | 0.06       | 0.0        | 0.4          | 0.3          |
| +20       | +0.06      | 0.0        | +0.4         | +0.3         |

DATA REQUIRED FOR OBSERVATION.

|             |   | No. | Star            | Mag.    | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|---|-----|-----------------|---------|---------------------------|---------------------------|
|             |   |     |                 |         | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 58 | E | 79  | $\alpha$ Caneri | 4.3     | 8 55.8                    | +12 3                     |
|             | W | 35  | $\lambda$ Tauri | 3.8-4.2 | 3 57.9                    | +12 21                    |

| $\varphi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |        |   |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|---------------------------------|------------|--------|---|
|           | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                      | $\Delta A$ |        |   |
|           |              |              |              |              |              |              |              |              |     |        |        | E                               | W          |        |   |
| + 0       | 6            | 26.7         | 39           | 29           | 250          | 51           | 109          | 39           | -71 | -      | 31     | +                               | -3.3       | + 11.5 | - |
| 1         |              | 26.7         | 39           | 10           | 252          | 0            | 108          | 30           | -71 | -      | 29     | +                               | -3.1       | + 11.7 | - |
| 2         |              | 26.7         | 38           | 52           | 253          | 10           | 107          | 19           | -72 | -      | 26     | +                               | -2.9       | + 11.9 | - |
| 3         |              | 26.7         | 38           | 35           | 254          | 22           | 106          | 8            | -72 | -      | 23     | +                               | -2.7       | + 12.1 | - |
| 4         |              | 26.7         | 38           | 19           | 255          | 35           | 104          | 55           | -73 | -      | 20     | +                               | -2.5       | + 12.3 | - |
| 5         |              | 26.8         | 38           | 5            | 256          | 49           | 103          | 41           | -73 | -      | 16     | +                               | -2.3       | + 12.4 | - |
| 6         |              | 26.8         | 37           | 51           | 258          | 4            | 102          | 26           | -73 | -      | 13     | +                               | -2.1       | + 12.6 | - |
| 7         |              | 26.8         | 37           | 39           | 259          | 20           | 101          | 10           | -73 | -      | 10     | +                               | -1.9       | + 12.7 | - |
| 8         |              | 26.8         | 37           | 29           | 260          | 37           | 99           | 53           | -73 | -      | 6      | +                               | -1.7       | + 12.8 | - |
| 9         |              | 26.8         | 37           | 19           | 261          | 54           | 98           | 36           | -73 | -      | 3      | +                               | -1.5       | + 13.0 | - |
| 10        |              | 26.8         | 37           | 11           | 263          | 12           | 97           | 18           | -73 | +      | 1      | -                               | -1.2       | + 13.1 | - |
| 11        |              | 26.9         | 37           | 4            | 264          | 31           | 95           | 59           | -73 | +      | 4      | -                               | -1.0       | + 13.2 | - |
| 12        |              | 26.9         | 36           | 59           | 265          | 51           | 94           | 40           | -73 | +      | 8      | -                               | -0.8       | + 13.2 | - |
| 13        |              | 26.9         | 36           | 55           | 267          | 10           | 93           | 20           | -73 | +      | 12     | -                               | -0.5       | + 13.3 | - |
| 14        |              | 26.9         | 36           | 53           | 268          | 30           | 92           | 1            | -73 | +      | 15     | -                               | -0.3       | + 13.3 | - |
| 15        |              | 26.9         | 36           | 52           | 269          | 50           | 90           | 41           | -72 | +      | 19     | -                               | -0.1       | + 13.4 | - |
| 16        |              | 26.9         | 36           | 52           | 271          | 10           | 89           | 21           | -72 | +      | 22     | -                               | +0.2       | + 13.3 | - |
| 17        |              | 27.0         | 36           | 53           | 272          | 30           | 88           | 1            | -72 | +      | 26     | -                               | +0.4       | + 13.3 | - |
| 18        |              | 27.0         | 36           | 56           | 273          | 50           | 86           | 41           | -71 | +      | 30     | -                               | +0.6       | + 13.3 | - |
| 19        |              | 27.0         | 37           | 1            | 275          | 9            | 85           | 22           | -71 | +      | 33     | -                               | +0.9       | + 13.2 | - |
| +20       | 6            | 27.0         | 37           | 7            | 276          | 29           | 84           | 3            | -70 | +      | 36     | -                               | +1.1       | + 13.2 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| °         | m          | '          | '            | '            |
| + 0       | +0.05      | 0.0        | +0.4         | +0.3         |
| 5         | 0.05       | 0.0        | 0.4          | 0.3          |
| 10        | 0.06       | 0.0        | 0.4          | 0.3          |
| 15        | 0.06       | 0.0        | 0.4          | 0.3          |
| +20       | +0.06      | 0.0        | +0.4         | +0.3         |



TABLE II.

| Pair No. | E | No. | Star            | Mag. | $\alpha_{1950}$ |      | $\delta_{1950}$ |    |
|----------|---|-----|-----------------|------|-----------------|------|-----------------|----|
|          |   |     |                 |      | h               | m    | °               | '  |
| 59       | E | 83  | $\sigma$ Leonis | 3.8  | 9               | 38.5 | +10             | 7  |
|          | W | 28  | $\xi$ Tauri     | 3.8  | 3               | 24.5 | +9              | 34 |

| $\phi$ | S |      | z  |    | $A_E$ | $A_W$ | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |    |   |      |   |     |   |
|--------|---|------|----|----|-------|-------|-----|--------|--------|------------------------------|----|---|------|---|-----|---|
|        | h | m    | °  | '  |       |       |     |        |        | $\Delta z$                   | E  | W |      |   |     |   |
| +0     | 6 | 31.7 | 48 | 9  | 256   | 21    | 102 | 53     | -73    | -                            | 16 | + | -2.3 | + | 8.7 | - |
| 1      |   | 31.6 | 47 | 56 | 257   | 14    | 102 | 0      | -73    | -                            | 14 | + | -2.1 | + | 8.8 | - |
| 2      |   | 31.6 | 47 | 43 | 258   | 7     | 101 | 7      | -74    | -                            | 11 | + | -2.0 | + | 8.9 | - |
| 3      |   | 31.6 | 47 | 32 | 259   | 1     | 100 | 13     | -74    | -                            | 9  | + | -1.8 | + | 9.0 | - |
| 4      |   | 31.6 | 47 | 21 | 259   | 55    | 99  | 19     | -74    | -                            | 7  | + | -1.7 | + | 9.1 | - |
| 5      |   | 31.5 | 47 | 12 | 260   | 50    | 98  | 24     | -74    | -                            | 4  | + | -1.5 | + | 9.1 | - |
| 6      |   | 31.5 | 47 | 3  | 261   | 45    | 97  | 29     | -74    | -                            | 2  | + | -1.4 | + | 9.2 | - |
| 7      |   | 31.5 | 46 | 55 | 262   | 40    | 96  | 33     | -74    | +                            | 1  | - | -1.2 | + | 9.3 | - |
| 8      |   | 31.4 | 46 | 48 | 263   | 36    | 95  | 38     | -74    | +                            | 3  | - | -1.1 | + | 9.3 | - |
| 9      |   | 31.4 | 46 | 43 | 264   | 32    | 94  | 41     | -74    | +                            | 6  | - | -0.9 | + | 9.4 | - |
| 10     |   | 31.4 | 46 | 38 | 265   | 28    | 93  | 45     | -74    | +                            | 8  | - | -0.7 | + | 9.4 | - |
| 11     |   | 31.4 | 46 | 34 | 266   | 25    | 92  | 48     | -73    | +                            | 11 | - | -0.6 | + | 9.4 | - |
| 12     |   | 31.3 | 46 | 31 | 267   | 22    | 91  | 51     | -73    | +                            | 13 | - | -0.4 | + | 9.5 | - |
| 13     |   | 31.3 | 46 | 29 | 268   | 18    | 90  | 54     | -73    | +                            | 16 | - | -0.2 | + | 9.5 | - |
| 14     |   | 31.3 | 46 | 28 | 269   | 15    | 89  | 57     | -73    | +                            | 18 | - | -0.1 | + | 9.5 | - |
| 15     |   | 31.2 | 46 | 28 | 270   | 12    | 89  | 0      | -72    | +                            | 20 | - | +0.1 | + | 9.5 | - |
| 16     |   | 31.2 | 46 | 30 | 271   | 9     | 88  | 3      | -72    | +                            | 23 | - | +0.3 | + | 9.5 | - |
| 17     |   | 31.2 | 46 | 32 | 272   | 6     | 87  | 6      | -72    | +                            | 25 | - | +0.4 | + | 9.4 | - |
| 18     |   | 31.2 | 46 | 35 | 273   | 2     | 86  | 9      | -71    | +                            | 28 | - | +0.6 | + | 9.4 | - |
| 19     |   | 31.1 | 46 | 39 | 273   | 59    | 85  | 13     | -71    | +                            | 30 | - | +0.8 | + | 9.4 | - |
| +20    | 6 | 31.1 | 46 | 44 | 274   | 55    | 84  | 16     | -70    | +                            | 32 | - | +0.9 | + | 9.3 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| 0      | m          | '          | '            | '            |
| +0     | +0.05      | 0.0        | +0.4         | +0.3         |
| 5      | 0.05       | 0.0        | 0.4          | 0.3          |
| 10     | 0.06       | 0.0        | 0.4          | 0.3          |
| 15     | 0.06       | 0.0        | 0.4          | 0.3          |
| +20    | +0.06      | 0.0        | +0.4         | +0.3         |

DATA REQUIRED FOR OBSERVATION.

| Pair No. | E | No. | Star          | Mag. | $\alpha_{1950}$ |      | $\delta_{1950}$ |    |
|----------|---|-----|---------------|------|-----------------|------|-----------------|----|
|          |   |     |               |      | h               | m    | °               | '  |
| 60       | E | 89  | $\rho$ Leonis | 3.9  | 10              | 30.2 | +9              | 34 |
|          | W | 23  | $\mu$ Ceti    | 4.4  | 2               | 42.2 | +9              | 54 |

| $\phi$ | S |      | z  |    | $A_E$ | $A_W$ | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |    |   |      |   |     |   |
|--------|---|------|----|----|-------|-------|-----|--------|--------|------------------------------|----|---|------|---|-----|---|
|        | h | m    | °  | '  |       |       |     |        |        | $\Delta z$                   | E  | W |      |   |     |   |
| +0     | 6 | 36.1 | 59 | 37 | 258   | 54    | 101 | 30     | -74    | -                            | 9  | + | -2.0 | + | 5.8 | - |
| 1      |   | 36.2 | 59 | 25 | 259   | 28    | 100 | 55     | -74    | -                            | 7  | + | -1.9 | + | 5.8 | - |
| 2      |   | 36.2 | 59 | 14 | 260   | 3     | 100 | 20     | -74    | -                            | 5  | + | -1.8 | + | 5.9 | - |
| 3      |   | 36.2 | 59 | 4  | 260   | 39    | 99  | 45     | -74    | -                            | 4  | + | -1.7 | + | 5.9 | - |
| 4      |   | 36.2 | 58 | 55 | 261   | 14    | 99  | 10     | -74    | -                            | 2  | + | -1.6 | + | 6.0 | - |
| 5      |   | 36.2 | 58 | 45 | 261   | 50    | 98  | 34     | -74    | 0                            |    |   | -1.5 | + | 6.0 | - |
| 6      |   | 36.2 | 58 | 37 | 262   | 26    | 97  | 58     | -74    | +                            | 2  | - | -1.4 | + | 6.1 | - |
| 7      |   | 36.2 | 58 | 29 | 263   | 3     | 97  | 21     | -74    | +                            | 3  | - | -1.3 | + | 6.1 | - |
| 8      |   | 36.3 | 58 | 22 | 263   | 39    | 96  | 45     | -74    | +                            | 5  | - | -1.1 | + | 6.1 | - |
| 9      |   | 36.3 | 58 | 15 | 264   | 16    | 96  | 8      | -74    | +                            | 7  | - | -1.0 | + | 6.2 | - |
| 10     |   | 36.3 | 58 | 10 | 264   | 53    | 95  | 31     | -73    | +                            | 9  | - | -0.9 | + | 6.2 | - |
| 11     |   | 36.3 | 58 | 4  | 265   | 31    | 94  | 54     | -73    | +                            | 11 | - | -0.8 | + | 6.2 | - |
| 12     |   | 36.3 | 58 | 0  | 266   | 8     | 94  | 17     | -73    | +                            | 12 | - | -0.7 | + | 6.2 | - |
| 13     |   | 36.3 | 57 | 56 | 266   | 45    | 93  | 39     | -73    | +                            | 14 | - | -0.6 | + | 6.3 | - |
| 14     |   | 36.3 | 57 | 53 | 267   | 23    | 93  | 2      | -73    | +                            | 16 | - | -0.5 | + | 6.3 | - |
| 15     |   | 36.4 | 57 | 50 | 268   | 1     | 92  | 24     | -72    | +                            | 18 | - | -0.4 | + | 6.3 | - |
| 16     |   | 36.4 | 57 | 48 | 268   | 39    | 91  | 46     | -72    | +                            | 20 | - | -0.3 | + | 6.3 | - |
| 17     |   | 36.4 | 57 | 47 | 269   | 16    | 91  | 9      | -72    | +                            | 21 | - | -0.2 | + | 6.3 | - |
| 18     |   | 36.4 | 57 | 46 | 269   | 54    | 90  | 31     | -71    | +                            | 23 | - | -0.1 | + | 6.3 | - |
| 19     |   | 36.4 | 57 | 46 | 270   | 32    | 89  | 53     | -71    | +                            | 25 | - | +0.1 | + | 6.3 | - |
| +20    | 6 | 36.4 | 57 | 47 | 271   | 10    | 89  | 15     | -70    | +                            | 27 | - | +0.2 | + | 6.3 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| 0      | m          | '          | '            | '            |
| +0     | +0.05      | 0.0        | +0.4         | +0.3         |
| 5      | 0.05       | 0.0        | 0.4          | 0.3          |
| 10     | 0.06       | 0.0        | 0.4          | 0.3          |
| 15     | 0.06       | 0.0        | 0.4          | 0.3          |
| +20    | +0.06      | 0.0        | +0.4         | +0.3         |



TABLE II.

| Pair No. | E | No. | Star              | Mag. | $\alpha_{1950}$ |      | $\delta_{1950}$ |    |
|----------|---|-----|-------------------|------|-----------------|------|-----------------|----|
|          |   |     |                   |      | h               | m    | °               | '  |
| 61       | E | 84  | $\epsilon$ Leonis | 3.1  | 9               | 43.0 | +24             | 0  |
|          | W | 32  | $\eta$ Tauri      | 3.0  | 3               | 44.5 | +23             | 57 |

| $\varphi$ | S      | z     | $A_E$  | $A_W$  | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |       |   |
|-----------|--------|-------|--------|--------|-----|--------|--------|---------------------------------|-------|---|
|           |        |       |        |        |     |        |        | $\Delta z$                      | E     | W |
| +0        | 6 43.8 | 50 7  | 237 59 | 121 56 | -63 | -34    | +      | -5.3                            | +7.1  | - |
| 1         | 43.8   | 49 36 | 238 43 | 121 13 | -64 | -33    | +      | -5.2                            | +7.3  | - |
| 2         | 43.8   | 49 5  | 239 27 | 120 29 | -65 | -31    | +      | -5.1                            | +7.5  | - |
| 3         | 43.8   | 48 35 | 240 12 | 119 43 | -65 | -30    | +      | -5.0                            | +7.7  | - |
| 4         | 43.8   | 48 6  | 240 59 | 118 57 | -65 | -28    | +      | -4.8                            | +7.9  | - |
| 5         | 43.8   | 47 37 | 241 46 | 118 9  | -66 | -27    | +      | -4.7                            | +8.1  | - |
| 6         | 43.8   | 47 9  | 242 35 | 117 20 | -66 | -25    | +      | -4.6                            | +8.2  | - |
| 7         | 43.8   | 46 42 | 243 25 | 116 30 | -67 | -23    | +      | -4.5                            | +8.4  | - |
| 8         | 43.8   | 46 15 | 244 16 | 115 39 | -67 | -21    | +      | -4.3                            | +8.6  | - |
| 9         | 43.8   | 45 50 | 245 9  | 114 47 | -67 | -19    | +      | -4.2                            | +8.8  | - |
| 10        | 43.8   | 45 25 | 246 2  | 113 53 | -67 | -17    | +      | -4.1                            | +9.0  | - |
| 11        | 43.8   | 45 1  | 246 57 | 112 59 | -68 | -15    | +      | -3.9                            | +9.2  | - |
| 12        | 43.8   | 44 38 | 247 53 | 112 3  | -68 | -13    | +      | -3.8                            | +9.4  | - |
| 13        | 43.8   | 44 16 | 248 49 | 111 6  | -68 | -11    | +      | -3.6                            | +9.6  | - |
| 14        | 43.8   | 43 55 | 249 47 | 110 8  | -68 | -9     | +      | -3.5                            | +9.7  | - |
| 15        | 43.8   | 43 35 | 250 46 | 109 9  | -68 | -6     | +      | -3.3                            | +9.9  | - |
| 16        | 43.8   | 43 15 | 251 46 | 108 9  | -69 | -4     | +      | -3.1                            | +10.1 | - |
| 17        | 43.8   | 42 57 | 252 47 | 107 8  | -69 | -1     | +      | -3.0                            | +10.3 | - |
| 18        | 43.8   | 42 40 | 253 49 | 106 6  | -69 | +1     | -      | -2.8                            | +10.4 | - |
| 19        | 43.8   | 42 24 | 254 52 | 105 3  | -69 | +4     | -      | -2.6                            | +10.6 | - |
| +20       | 6 43.8 | 42 9  | 255 56 | 103 59 | -68 | +6     | -      | -2.4                            | +10.8 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| +0        | +0.05      | 0.0        | +0.4         | +0.3         |
| 5         | 0.05       | 0.0        | 0.4          | 0.3          |
| 10        | 0.06       | 0.0        | 0.4          | 0.3          |
| 15        | 0.06       | 0.0        | 0.4          | 0.3          |
| +20       | +0.06      | 0.0        | +0.4         | +0.3         |

DATA REQUIRED FOR OBSERVATION.

| Pair No. | E | No. | Star            | Mag. | $\alpha_{1950}$ |      | $\delta_{1950}$ |    |
|----------|---|-----|-----------------|------|-----------------|------|-----------------|----|
|          |   |     |                 |      | h               | m    | °               | '  |
| 62       | E | 87  | $\alpha$ Leonis | 1.3  | 10              | 5.7  | +12             | 13 |
|          | W | 29  | 5 Tauri         | 4.3  | 3               | 28.1 | +12             | 46 |

| $\varphi$ | S      | z     | $A_E$  | $A_W$  | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |      |   |
|-----------|--------|-------|--------|--------|-----|--------|--------|---------------------------------|------|---|
|           |        |       |        |        |     |        |        | $\Delta z$                      | E    | W |
| +0        | 6 46.7 | 51 27 | 254 19 | 106 25 | -72 | -17    | +      | -2.8                            | +7.7 | - |
| 1         | 46.7   | 51 10 | 255 5  | 105 39 | -72 | -15    | +      | -2.6                            | +7.8 | - |
| 2         | 46.8   | 50 55 | 255 52 | 104 52 | -73 | -13    | +      | -2.5                            | +7.9 | - |
| 3         | 46.8   | 50 40 | 256 39 | 104 5  | -73 | -11    | +      | -2.4                            | +8.0 | - |
| 4         | 46.8   | 50 27 | 257 27 | 103 17 | -73 | -9     | +      | -2.2                            | +8.1 | - |
| 5         | 46.8   | 50 14 | 258 16 | 102 28 | -73 | -7     | +      | -2.1                            | +8.1 | - |
| 6         | 46.9   | 50 1  | 259 5  | 101 39 | -73 | -5     | +      | -2.0                            | +8.2 | - |
| 7         | 46.9   | 49 50 | 259 55 | 100 49 | -73 | -3     | +      | -1.8                            | +8.3 | - |
| 8         | 46.9   | 49 40 | 260 45 | 99 59  | -73 | 0      | -      | -1.7                            | +8.4 | - |
| 9         | 46.9   | 49 30 | 261 35 | 99 9   | -73 | +2     | -      | -1.5                            | +8.4 | - |
| 10        | 47.0   | 49 21 | 262 26 | 98 18  | -73 | +4     | -      | -1.4                            | +8.5 | - |
| 11        | 47.0   | 49 13 | 263 17 | 97 27  | -73 | +6     | -      | -1.2                            | +8.6 | - |
| 12        | 47.0   | 49 6  | 264 9  | 96 36  | -73 | +9     | -      | -1.1                            | +8.6 | - |
| 13        | 47.0   | 49 0  | 265 1  | 95 44  | -73 | +11    | -      | -0.9                            | +8.7 | - |
| 14        | 47.1   | 48 55 | 265 53 | 94 52  | -72 | +13    | -      | -0.8                            | +8.7 | - |
| 15        | 47.1   | 48 51 | 266 45 | 94 0   | -72 | +15    | -      | -0.6                            | +8.7 | - |
| 16        | 47.1   | 48 48 | 267 38 | 93 8   | -72 | +18    | -      | -0.5                            | +8.8 | - |
| 17        | 47.2   | 48 45 | 268 31 | 92 15  | -72 | +20    | -      | -0.3                            | +8.8 | - |
| 18        | 47.2   | 48 44 | 269 23 | 91 23  | -71 | +22    | -      | -0.2                            | +8.8 | - |
| 19        | 47.2   | 48 43 | 270 16 | 90 30  | -71 | +24    | -      | 0.0                             | +8.8 | - |
| +20       | 6 47.2 | 48 43 | 271 9  | 89 38  | -70 | +27    | -      | +0.1                            | +8.8 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| +0        | +0.05      | 0.0        | +0.4         | +0.3         |
| 5         | 0.05       | 0.0        | 0.4          | 0.3          |
| 10        | 0.06       | 0.0        | 0.4          | 0.3          |
| 15        | 0.06       | 0.0        | 0.4          | 0.3          |
| +20       | +0.06      | 0.0        | +0.4         | +0.3         |



TABLE II.

|             | No.  | Star           | Mag. | $\alpha_{1950}$ | $\delta_{1950}$ |
|-------------|------|----------------|------|-----------------|-----------------|
| Pair No. 63 | E 89 | $\rho$ Leonis  | 3.9  | 10 30.2         | +9 34           |
|             | W 27 | $\sigma$ Tauri | 3.8  | 3 22.1          | +8 51           |

| $\varphi$ | S      | z     | $A_E$  | $A_W$  | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |                   |
|-----------|--------|-------|--------|--------|-----|--------|--------|---------------------------------|-------------------|
|           |        |       |        |        |     |        |        | $\Delta z$                      | $\Delta A$<br>E W |
| +0        | 6 56.3 | 54 40 | 258 15 | 100 52 | -74 | - 11 + | -2.0   | + 7.0 -                         |                   |
| 1         | 56.3   | 54 29 | 258 57 | 100 10 | -74 | - 9 +  | -1.8   | + 7.0 -                         |                   |
| 2         | 56.3   | 54 18 | 259 39 | 99 28  | -74 | - 7 +  | -1.7   | + 7.1 -                         |                   |
| 3         | 56.2   | 54 8  | 260 22 | 98 45  | -74 | - 5 +  | -1.6   | + 7.1 -                         |                   |
| 4         | 56.2   | 53 59 | 261 5  | 98 2   | -74 | - 3 +  | -1.5   | + 7.2 -                         |                   |
| 5         | 56.2   | 53 50 | 261 48 | 97 19  | -74 | - 1 +  | -1.4   | + 7.2 -                         |                   |
| 6         | 56.1   | 53 43 | 262 31 | 96 35  | -74 | + 1 -  | -1.2   | + 7.3 -                         |                   |
| 7         | 56.1   | 53 36 | 263 15 | 95 52  | -74 | + 3 -  | -1.1   | + 7.3 -                         |                   |
| 8         | 56.1   | 53 29 | 263 59 | 95 7   | -74 | + 5 -  | -1.0   | + 7.4 -                         |                   |
| 9         | 56.0   | 53 24 | 264 43 | 94 23  | -74 | + 7 -  | -0.9   | + 7.4 -                         |                   |
| 10        | 56.0   | 53 19 | 265 28 | 93 38  | -74 | + 9 -  | -0.7   | + 7.4 -                         |                   |
| 11        | 56.0   | 53 15 | 266 12 | 92 54  | -73 | + 11 - | -0.6   | + 7.4 -                         |                   |
| 12        | 56.0   | 53 12 | 266 57 | 92 9   | -73 | + 13 - | -0.5   | + 7.5 -                         |                   |
| 13        | 55.9   | 53 10 | 267 42 | 91 24  | -73 | + 15 - | -0.3   | + 7.5 -                         |                   |
| 14        | 55.9   | 53 8  | 268 27 | 90 39  | -73 | + 17 - | -0.2   | + 7.5 -                         |                   |
| 15        | 55.9   | 53 8  | 269 12 | 89 54  | -72 | + 19 - | -0.1   | + 7.5 -                         |                   |
| 16        | 55.8   | 53 8  | 269 56 | 89 9   | -72 | + 21 - | +0.1   | + 7.5 -                         |                   |
| 17        | 55.8   | 53 8  | 270 41 | 88 23  | -72 | + 23 - | +0.2   | + 7.5 -                         |                   |
| 18        | 55.8   | 53 10 | 271 26 | 87 38  | -71 | + 25 - | +0.3   | + 7.5 -                         |                   |
| 19        | 55.7   | 53 12 | 272 11 | 86 53  | -71 | + 27 - | +0.5   | + 7.4 -                         |                   |
| +20       | 6 55.7 | 53 15 | 272 55 | 86 8   | -70 | + 29 - | +0.6   | + 7.4 -                         |                   |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| +0        | +0.05      | 0.0        | +0.4         | +0.3         |
| 5         | 0.05       | 0.0        | 0.4          | 0.3          |
| 10        | 0.06       | 0.0        | 0.4          | 0.3          |
| 15        | 0.06       | 0.0        | 0.4          | 0.3          |
| +20       | +0.06      | 0.0        | +0.4         | +0.3         |

DATA REQUIRED FOR OBSERVATION.

|             | No.  | Star            | Mag.    | $\alpha_{1950}$ | $\delta_{1950}$ |
|-------------|------|-----------------|---------|-----------------|-----------------|
| Pair No. 64 | E 87 | $\alpha$ Leonis | 1.3     | 10 5.7          | +12 13          |
|             | W 35 | $\lambda$ Tauri | 3.8-4.2 | 3 57.9          | +12 21          |

| $\varphi$ | S     | z     | $A_E$  | $A_W$  | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |                   |
|-----------|-------|-------|--------|--------|-----|--------|--------|---------------------------------|-------------------|
|           |       |       |        |        |     |        |        | $\Delta z$                      | $\Delta A$<br>E W |
| +0        | 7 1.8 | 47 50 | 253 25 | 106 46 | -72 | - 20 + | -2.9   | + 8.7 -                         |                   |
| 1         | 1.8   | 47 33 | 254 18 | 105 54 | -72 | - 18 + | -2.7   | + 8.8 -                         |                   |
| 2         | 1.8   | 47 17 | 255 11 | 105 1  | -72 | - 16 + | -2.6   | + 8.9 -                         |                   |
| 3         | 1.8   | 47 2  | 256 5  | 104 7  | -73 | - 14 + | -2.4   | + 9.0 -                         |                   |
| 4         | 1.8   | 46 48 | 256 59 | 103 12 | -73 | - 11 + | -2.3   | + 9.1 -                         |                   |
| 5         | 1.8   | 46 35 | 257 54 | 102 17 | -73 | - 9 +  | -2.1   | + 9.3 -                         |                   |
| 6         | 1.8   | 46 23 | 258 50 | 101 21 | -73 | - 6 +  | -2.0   | + 9.4 -                         |                   |
| 7         | 1.8   | 46 11 | 259 47 | 100 25 | -73 | - 4 +  | -1.8   | + 9.4 -                         |                   |
| 8         | 1.8   | 46 1  | 260 43 | 99 28  | -73 | - 1 +  | -1.6   | + 9.5 -                         |                   |
| 9         | 1.8   | 45 52 | 261 41 | 98 31  | -73 | + 1 -  | -1.5   | + 9.6 -                         |                   |
| 10        | 1.8   | 45 44 | 262 39 | 97 33  | -73 | + 4 -  | -1.3   | + 9.7 -                         |                   |
| 11        | 1.8   | 45 36 | 263 37 | 96 35  | -73 | + 6 -  | -1.1   | + 9.7 -                         |                   |
| 12        | 1.8   | 45 30 | 264 35 | 95 37  | -73 | + 9 -  | -1.0   | + 9.8 -                         |                   |
| 13        | 1.8   | 45 25 | 265 34 | 94 38  | -73 | + 11 - | -0.8   | + 9.8 -                         |                   |
| 14        | 1.8   | 45 21 | 266 33 | 93 39  | -73 | + 14 - | -0.6   | + 9.9 -                         |                   |
| 15        | 1.9   | 45 17 | 267 33 | 92 40  | -72 | + 16 - | -0.5   | + 9.9 -                         |                   |
| 16        | 1.9   | 45 15 | 268 32 | 91 40  | -72 | + 19 - | -0.3   | + 9.9 -                         |                   |
| 17        | 1.9   | 45 14 | 269 31 | 90 41  | -72 | + 22 - | -0.1   | + 9.9 -                         |                   |
| 18        | 1.9   | 45 14 | 270 31 | 89 41  | -71 | + 24 - | +0.1   | + 9.9 -                         |                   |
| 19        | 1.9   | 45 15 | 271 31 | 88 42  | -71 | + 27 - | +0.3   | + 9.9 -                         |                   |
| +20       | 7 1.9 | 45 17 | 272 30 | 87 42  | -70 | + 29 - | +0.4   | + 9.9 -                         |                   |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| +0        | +0.05      | 0.0        | +0.4         | +0.2         |
| 5         | 0.05       | 0.0        | 0.4          | 0.2          |
| 10        | 0.06       | 0.0        | 0.4          | 0.2          |
| 15        | 0.06       | 0.0        | 0.4          | 0.2          |
| +20       | +0.06      | 0.0        | +0.4         | +0.3         |



TABLE II.

|             | No.  | Star           | Mag. | $\alpha_{1950}$ | $\delta_{1950}$ |
|-------------|------|----------------|------|-----------------|-----------------|
| Pair No. 65 | E 86 | $\eta$ Leonis  | 3.6  | 10 4.6          | +17 0           |
|             | W 39 | $\delta$ Tauri | 3.9  | 4 20.0          | +17 26          |

| $\varphi$ | S      | z     | $A_E$  | $A_W$  | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |        |
|-----------|--------|-------|--------|--------|-----|--------|--------|---------------------------------|------------|--------|
|           |        |       |        |        |     |        |        | $\Delta z$                      | $\Delta A$ |        |
|           |        |       |        |        |     |        |        | E                               | W          |        |
| + 0       | 7 12.1 | 46 19 | 246 9  | 114 28 | -68 | - 30   | +      | -4.1                            | +          | 8.7 -  |
| 1         | 12.1   | 45 55 | 247 2  | 113 35 | -69 | - 28   | +      | -4.0                            | +          | 8.9 -  |
| 2         | 12.1   | 45 32 | 247 56 | 112 41 | -69 | - 26   | +      | -3.8                            | +          | 9.1 -  |
| 3         | 12.1   | 45 9  | 248 51 | 111 46 | -70 | - 24   | +      | -3.7                            | +          | 9.3 -  |
| 4         | 12.1   | 44 48 | 249 47 | 110 50 | -70 | - 22   | +      | -3.5                            | +          | 9.4 -  |
| 5         | 12.2   | 44 27 | 250 44 | 109 53 | -70 | - 20   | +      | -3.4                            | +          | 9.6 -  |
| 6         | 12.2   | 44 8  | 251 42 | 108 55 | -71 | - 17   | +      | -3.2                            | +          | 9.8 -  |
| 7         | 12.2   | 43 49 | 252 41 | 107 56 | -71 | - 15   | +      | -3.0                            | +          | 9.9 -  |
| 8         | 12.2   | 43 31 | 253 42 | 106 56 | -71 | - 13   | +      | -2.9                            | +          | 10.1 - |
| 9         | 12.3   | 43 15 | 254 42 | 105 55 | -71 | - 10   | +      | -2.7                            | +          | 10.2 - |
| 10        | 12.3   | 42 59 | 255 44 | 104 53 | -71 | - 7    | +      | -2.5                            | +          | 10.4 - |
| 11        | 12.3   | 42 44 | 256 47 | 103 50 | -72 | - 5    | +      | -2.3                            | +          | 10.5 - |
| 12        | 12.3   | 42 31 | 257 51 | 102 47 | -72 | - 2    | +      | -2.2                            | +          | 10.6 - |
| 13        | 12.3   | 42 19 | 258 55 | 101 43 | -72 | + 1    | -      | -2.0                            | +          | 10.8 - |
| 14        | 12.4   | 42 7  | 260 0  | 100 38 | -72 | + 3    | -      | -1.8                            | +          | 10.9 - |
| 15        | 12.4   | 41 57 | 261 6  | 99 32  | -71 | + 6    | -      | -1.6                            | +          | 11.0 - |
| 16        | 12.4   | 41 48 | 262 12 | 98 26  | -71 | + 9    | -      | -1.4                            | +          | 11.1 - |
| 17        | 12.4   | 41 40 | 263 19 | 97 20  | -71 | + 12   | -      | -1.2                            | +          | 11.2 - |
| 18        | 12.5   | 41 33 | 264 26 | 96 13  | -71 | + 15   | -      | -1.0                            | +          | 11.2 - |
| 19        | 12.5   | 41 28 | 265 33 | 95 6   | -71 | + 18   | -      | -0.8                            | +          | 11.3 - |
| +20       | 7 12.5 | 41 23 | 266 41 | 93 58  | -70 | + 21   | -      | -0.6                            | +          | 11.4 - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| + 0       | +0.05      | 0.0        | +0.4         | +0.2         |
| 5         | 0.05       | 0.0        | 0.4          | 0.2          |
| 10        | 0.06       | 0.0        | 0.4          | 0.2          |
| 15        | 0.06       | 0.0        | 0.5          | 0.2          |
| +20       | +0.06      | 0.0        | +0.5         | +0.2         |

DATA REQUIRED FOR OBSERVATION.

|             | No.  | Star           | Mag. | $\alpha_{1950}$ | $\delta_{1950}$ |
|-------------|------|----------------|------|-----------------|-----------------|
| Pair No. 66 | E 86 | $\eta$ Leonis  | 3.6  | 10 4.6          | +17 0           |
|             | W 40 | $\alpha$ Tauri | 1.1  | 4 33.0          | +16 25          |

| $\varphi$ | S      | z     | $A_E$  | $A_W$  | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |        |
|-----------|--------|-------|--------|--------|-----|--------|--------|---------------------------------|------------|--------|
|           |        |       |        |        |     |        |        | $\Delta z$                      | $\Delta A$ |        |
|           |        |       |        |        |     |        |        | E                               | W          |        |
| + 0       | 7 19.2 | 44 41 | 245 25 | 113 41 | -68 | - 32   | +      | -4.1                            | +          | 9.2 -  |
| 1         | 19.2   | 44 17 | 246 21 | 112 45 | -69 | - 30   | +      | -3.9                            | +          | 9.4 -  |
| 2         | 19.2   | 43 54 | 247 18 | 111 48 | -69 | - 28   | +      | -3.8                            | +          | 9.6 -  |
| 3         | 19.1   | 43 32 | 248 17 | 110 50 | -70 | - 26   | +      | -3.6                            | +          | 9.8 -  |
| 4         | 19.1   | 43 10 | 249 16 | 109 50 | -70 | - 23   | +      | -3.5                            | +          | 10.0 - |
| 5         | 19.1   | 42 50 | 250 17 | 108 49 | -71 | - 21   | +      | -3.3                            | +          | 10.2 - |
| 6         | 19.0   | 42 31 | 251 18 | 107 48 | -71 | - 18   | +      | -3.1                            | +          | 10.4 - |
| 7         | 19.0   | 42 12 | 252 21 | 106 45 | -71 | - 16   | +      | -3.0                            | +          | 10.5 - |
| 8         | 19.0   | 41 55 | 253 24 | 105 41 | -71 | - 13   | +      | -2.8                            | +          | 10.7 - |
| 9         | 18.9   | 41 39 | 254 29 | 104 37 | -72 | - 10   | +      | -2.6                            | +          | 10.8 - |
| 10        | 18.9   | 41 24 | 255 34 | 103 31 | -72 | - 8    | +      | -2.4                            | +          | 11.0 - |
| 11        | 18.9   | 41 10 | 256 41 | 102 24 | -72 | - 5    | +      | -2.2                            | +          | 11.1 - |
| 12        | 18.9   | 40 57 | 257 48 | 101 17 | -72 | - 2    | +      | -2.0                            | +          | 11.2 - |
| 13        | 18.8   | 40 46 | 258 56 | 100 9  | -72 | + 1    | -      | -1.8                            | +          | 11.4 - |
| 14        | 18.8   | 40 35 | 260 4  | 99 0   | -72 | + 4    | -      | -1.7                            | +          | 11.5 - |
| 15        | 18.8   | 40 26 | 261 14 | 97 51  | -72 | + 7    | -      | -1.5                            | +          | 11.6 - |
| 16        | 18.7   | 40 18 | 262 24 | 96 40  | -72 | + 10   | -      | -1.2                            | +          | 11.7 - |
| 17        | 18.7   | 40 11 | 263 34 | 95 30  | -71 | + 13   | -      | -1.0                            | +          | 11.7 - |
| 18        | 18.6   | 40 5  | 264 44 | 94 19  | -71 | + 16   | -      | -0.8                            | +          | 11.8 - |
| 19        | 18.6   | 40 1  | 265 55 | 93 8   | -71 | + 19   | -      | -0.6                            | +          | 11.9 - |
| +20       | 7 18.6 | 39 58 | 267 7  | 91 56  | -70 | + 22   | -      | -0.4                            | +          | 11.9 - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| + 0       | +0.05      | -0.1       | +0.4         | +0.2         |
| 5         | 0.05       | 0.0        | 0.4          | 0.2          |
| 10        | 0.06       | 0.0        | 0.5          | 0.2          |
| 15        | 0.06       | 0.0        | 0.5          | 0.2          |
| +20       | +0.06      | 0.0        | +0.5         | +0.2         |



TABLE II.

|             | No.  | Star          | Mag. | $\alpha_{1950}$ | $\delta_{1950}$ |
|-------------|------|---------------|------|-----------------|-----------------|
| Pair No. 67 | E 91 | 46 Leon. Min. | 3.9  | 10 50.5         | +34 29          |
|             | W 34 | $\xi$ Persei  | 4.1  | 3 55.7          | +35 39          |

| $\phi$ | S |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |      |      |   |
|--------|---|------|----|----|-------|----|-------|----|-----|--------|--------|------------------------------|------|------|---|
|        | h | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                   | E    | W    |   |
| +0     | 7 | 21.8 | 60 | 6  | 229   | 14 | 132   | 15 | -56 | -      | 29     | +                            | -6.6 | +4.3 | - |
| 1      |   | 21.9 | 59 | 26 | 229   | 40 | 131   | 49 | -56 | -      | 28     | +                            | -6.6 | +4.5 | - |
| 2      |   | 21.9 | 58 | 47 | 230   | 7  | 131   | 22 | -57 | -      | 28     | +                            | -6.5 | +4.6 | - |
| 3      |   | 22.0 | 58 | 8  | 230   | 35 | 130   | 54 | -57 | -      | 27     | +                            | -6.5 | +4.8 | - |
| 4      |   | 22.1 | 57 | 30 | 231   | 4  | 130   | 25 | -58 | -      | 26     | +                            | -6.4 | +4.9 | - |
| 5      |   | 22.1 | 56 | 52 | 231   | 34 | 129   | 55 | -58 | -      | 25     | +                            | -6.3 | +5.1 | - |
| 6      |   | 22.2 | 56 | 14 | 232   | 5  | 129   | 24 | -58 | -      | 24     | +                            | -6.3 | +5.2 | - |
| 7      |   | 22.2 | 55 | 37 | 232   | 37 | 128   | 52 | -58 | -      | 23     | +                            | -6.2 | +5.4 | - |
| 8      |   | 22.3 | 55 | 0  | 233   | 10 | 128   | 20 | -59 | -      | 22     | +                            | -6.1 | +5.6 | - |
| 9      |   | 22.3 | 54 | 23 | 233   | 44 | 127   | 46 | -59 | -      | 21     | +                            | -6.0 | +5.7 | - |
| 10     |   | 22.4 | 53 | 47 | 234   | 19 | 127   | 11 | -59 | -      | 20     | +                            | -5.9 | +5.9 | - |
| 11     |   | 22.4 | 53 | 12 | 234   | 55 | 126   | 35 | -60 | -      | 19     | +                            | -5.9 | +6.1 | - |
| 12     |   | 22.5 | 52 | 37 | 235   | 32 | 125   | 59 | -60 | -      | 17     | +                            | -5.8 | +6.3 | - |
| 13     |   | 22.5 | 52 | 3  | 236   | 10 | 125   | 21 | -60 | -      | 16     | +                            | -5.7 | +6.5 | - |
| 14     |   | 22.6 | 51 | 29 | 236   | 50 | 124   | 42 | -60 | -      | 15     | +                            | -5.6 | +6.6 | - |
| 15     |   | 22.6 | 50 | 56 | 237   | 30 | 124   | 2  | -60 | -      | 13     | +                            | -5.5 | +6.8 | - |
| 16     |   | 22.7 | 50 | 23 | 238   | 11 | 123   | 21 | -61 | -      | 12     | +                            | -5.4 | +7.0 | - |
| 17     |   | 22.8 | 49 | 51 | 238   | 54 | 122   | 39 | -61 | -      | 11     | +                            | -5.3 | +7.2 | - |
| 18     |   | 22.8 | 49 | 20 | 239   | 38 | 121   | 56 | -61 | -      | 9      | +                            | -5.2 | +7.4 | - |
| 19     |   | 22.9 | 48 | 49 | 240   | 23 | 121   | 11 | -61 | -      | 8      | +                            | -5.1 | +7.6 | - |
| +20    | 7 | 22.9 | 48 | 19 | 241   | 9  | 120   | 26 | -61 | -      | 6      | +                            | -5.0 | +7.8 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| +0     | m          | '          | '            | '            |
| 5      | +0.05      | -0.1       | +0.4         | +0.3         |
| 10     | 0.05       | 0.1        | 0.4          | 0.3          |
| 15     | 0.06       | 0.1        | 0.4          | 0.3          |
| +20    | +0.06      | -0.1       | +0.4         | +0.2         |

DATA REQUIRED FOR OBSERVATION.

|             | No.  | Star              | Mag. | $\alpha_{1950}$ | $\delta_{1950}$ |
|-------------|------|-------------------|------|-----------------|-----------------|
| Pair No. 68 | E 96 | $\delta$ Crateris | 3.8  | 11 16.8         | -14 30          |
|             | W 33 | $\gamma$ Eridani  | 3.2  | 3 55.7          | -13 39          |

| $\phi$ | S |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |      |      |   |
|--------|---|------|----|----|-------|----|-------|----|-----|--------|--------|------------------------------|------|------|---|
|        | h | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                   | E    | W    |   |
| +0     | 7 | 36.6 | 56 | 56 | 287   | 24 | 73    | 39 | -72 | +      | 15     | -                            | +2.9 | +6.2 | - |
| 1      |   | 36.6 | 57 | 14 | 288   | 1  | 73    | 3  | -72 | +      | 16     | -                            | +3.0 | +6.1 | - |
| 2      |   | 36.6 | 57 | 32 | 288   | 38 | 72    | 27 | -71 | +      | 18     | -                            | +3.1 | +6.1 | - |
| 3      |   | 36.7 | 57 | 51 | 289   | 14 | 71    | 51 | -71 | +      | 20     | -                            | +3.2 | +6.0 | - |
| 4      |   | 36.7 | 58 | 10 | 289   | 49 | 71    | 15 | -71 | +      | 21     | -                            | +3.3 | +5.9 | - |
| 5      |   | 36.8 | 58 | 31 | 290   | 24 | 70    | 39 | -70 | +      | 23     | -                            | +3.4 | +5.8 | - |
| 6      |   | 36.8 | 58 | 51 | 290   | 58 | 70    | 5  | -70 | +      | 24     | -                            | +3.5 | +5.7 | - |
| 7      |   | 36.8 | 59 | 12 | 291   | 32 | 69    | 31 | -69 | +      | 26     | -                            | +3.6 | +5.6 | - |
| 8      |   | 36.9 | 59 | 34 | 292   | 5  | 68    | 58 | -69 | +      | 27     | -                            | +3.7 | +5.5 | - |
| 9      |   | 36.9 | 59 | 57 | 292   | 38 | 68    | 26 | -69 | +      | 28     | -                            | +3.8 | +5.4 | - |
| 10     |   | 36.9 | 60 | 19 | 293   | 10 | 67    | 54 | -68 | +      | 30     | -                            | +3.9 | +5.3 | - |
| 11     |   | 37.0 | 60 | 43 | 293   | 41 | 67    | 23 | -68 | +      | 31     | -                            | +3.9 | +5.2 | - |
| 12     |   | 37.0 | 61 | 7  | 294   | 12 | 66    | 53 | -67 | +      | 32     | -                            | +4.0 | +5.1 | - |
| 13     |   | 37.1 | 61 | 31 | 294   | 42 | 66    | 23 | -67 | +      | 34     | -                            | +4.1 | +5.0 | - |
| 14     |   | 37.1 | 61 | 56 | 295   | 11 | 65    | 53 | -66 | +      | 35     | -                            | +4.2 | +4.9 | - |
| 15     |   | 37.1 | 62 | 21 | 295   | 40 | 65    | 25 | -65 | +      | 36     | -                            | +4.3 | +4.8 | - |
| 16     |   | 37.2 | 62 | 47 | 296   | 9  | 64    | 57 | -65 | +      | 37     | -                            | +4.3 | +4.7 | - |
| 17     |   | 37.2 | 63 | 13 | 296   | 36 | 64    | 29 | -64 | +      | 38     | -                            | +4.4 | +4.6 | - |
| 18     |   | 37.3 | 63 | 39 | 297   | 3  | 64    | 3  | -64 | +      | 39     | -                            | +4.5 | +4.5 | - |
| 19     |   | 37.3 | 64 | 6  | 297   | 30 | 63    | 37 | -63 | +      | 41     | -                            | +4.5 | +4.4 | - |
| +20    | 7 | 37.3 | 64 | 34 | 297   | 56 | 63    | 11 | -62 | +      | 42     | -                            | +4.6 | +4.2 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| +0     | m          | '          | '            | '            |
| 5      | +0.05      | 0.0        | +0.4         | +0.2         |
| 10     | 0.05       | +0.1       | 0.4          | 0.2          |
| 15     | 0.06       | 0.1        | 0.4          | 0.2          |
| +20    | +0.06      | +0.1       | +0.4         | +0.3         |



TABLE II.

| Pair No. | E | No. | Star              | Mag. | $\alpha_{1950}$ |      | $\delta_{1950}$ |    |
|----------|---|-----|-------------------|------|-----------------|------|-----------------|----|
|          |   |     |                   |      | h               | m    | °               | '  |
| 69       | E | 101 | $\alpha$ Virginis | 4.2  | 12              | 27   | +9              | 1  |
|          | W | 27  | $\alpha$ Tauri    | 3.8  | 3               | 22.1 | +8              | 51 |

| $\varphi$ | S |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | d $A_E$ | d $A_W$ | Var. for $\Delta\varphi = +10'$ |      |      |   |
|-----------|---|------|----|----|-------|----|-------|----|-----|---------|---------|---------------------------------|------|------|---|
|           | h | m    | °  | '  | °     | '  | °     | '  |     |         |         | $\Delta z$                      | E    | W    |   |
| +0        | 7 | 42.4 | 66 | 0  | 260   | 8  | 99    | 42 | -74 | -       | 6       | +                               | -1.7 | +4.4 | - |
| 1         |   | 42.4 | 65 | 50 | 260   | 34 | 99    | 16 | -74 | -       | 4       | +                               | -1.6 | +4.4 | - |
| 2         |   | 42.4 | 65 | 41 | 261   | 1  | 98    | 49 | -74 | -       | 3       | +                               | -1.5 | +4.5 | - |
| 3         |   | 42.4 | 65 | 32 | 261   | 28 | 98    | 22 | -74 | -       | 1       | +                               | -1.5 | +4.5 | - |
| 4         |   | 42.4 | 65 | 23 | 261   | 55 | 97    | 55 | -74 |         | 0       |                                 | -1.4 | +4.5 | - |
| 5         |   | 42.4 | 65 | 15 | 262   | 22 | 97    | 28 | -74 | +       | 2       | -                               | -1.3 | +4.6 | - |
| 6         |   | 42.4 | 65 | 8  | 262   | 50 | 97    | 0  | -74 | +       | 4       | -                               | -1.2 | +4.6 | - |
| 7         |   | 42.4 | 65 | 0  | 263   | 17 | 96    | 32 | -74 | +       | 5       | -                               | -1.2 | +4.6 | - |
| 8         |   | 42.4 | 64 | 54 | 263   | 45 | 96    | 4  | -74 | +       | 7       | -                               | -1.1 | +4.6 | - |
| 9         |   | 42.4 | 64 | 48 | 264   | 13 | 95    | 36 | -74 | +       | 8       | -                               | -1.0 | +4.7 | - |
| 10        |   | 42.4 | 64 | 42 | 264   | 41 | 95    | 8  | -74 | +       | 10      | -                               | -0.9 | +4.7 | - |
| 11        |   | 42.3 | 64 | 37 | 265   | 10 | 94    | 40 | -73 | +       | 11      | -                               | -0.8 | +4.7 | - |
| 12        |   | 42.3 | 64 | 32 | 265   | 38 | 94    | 11 | -73 | +       | 13      | -                               | -0.8 | +4.8 | - |
| 13        |   | 42.3 | 64 | 28 | 266   | 7  | 93    | 43 | -73 | +       | 15      | -                               | -0.7 | +4.8 | - |
| 14        |   | 42.3 | 64 | 24 | 266   | 35 | 93    | 14 | -73 | +       | 16      | -                               | -0.6 | +4.8 | - |
| 15        |   | 42.3 | 64 | 21 | 267   | 4  | 92    | 45 | -72 | +       | 18      | -                               | -0.5 | +4.8 | - |
| 16        |   | 42.3 | 64 | 18 | 267   | 33 | 92    | 16 | -72 | +       | 19      | -                               | -0.4 | +4.8 | - |
| 17        |   | 42.3 | 64 | 16 | 268   | 2  | 91    | 48 | -72 | +       | 21      | -                               | -0.3 | +4.8 | - |
| 18        |   | 42.3 | 64 | 14 | 268   | 31 | 91    | 19 | -71 | +       | 22      | -                               | -0.3 | +4.8 | - |
| 19        |   | 42.3 | 64 | 13 | 268   | 59 | 90    | 50 | -71 | +       | 24      | -                               | -0.2 | +4.8 | - |
| +20       | 7 | 42.3 | 64 | 12 | 269   | 28 | 90    | 21 | -70 | +       | 25      | -                               | -0.1 | +4.8 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| +0        | +0.05      | 0.0        | +0.4         | +0.2         |
| 5         | 0.05       | 0.0        | 0.4          | 0.2          |
| 10        | 0.05       | 0.0        | 0.4          | 0.2          |
| 15        | 0.06       | 0.0        | 0.4          | 0.2          |
| +20       | +0.06      | 0.0        | +0.4         | +0.3         |

DATA REQUIRED FOR OBSERVATION.

| Pair No. | E | No. | Star            | Mag. | $\alpha_{1950}$ |      | $\delta_{1950}$ |    |
|----------|---|-----|-----------------|------|-----------------|------|-----------------|----|
|          |   |     |                 |      | h               | m    | °               | '  |
| 70       | E | 94  | $\theta$ Leonis | 3.4  | 11              | 11.6 | +15             | 42 |
|          | W | 40  | $\alpha$ Tauri  | 1.1  | 4               | 33.0 | +16             | 25 |

| $\varphi$ | S |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | d $A_E$ | d $A_W$ | Var. for $\Delta\varphi = +10'$ |      |      |   |
|-----------|---|------|----|----|-------|----|-------|----|-----|---------|---------|---------------------------------|------|------|---|
|           | h | m    | °  | '  | °     | '  | °     | '  |     |         |         | $\Delta z$                      | E    | W    |   |
| +0        | 7 | 52.0 | 52 | 16 | 250   | 0  | 110   | 56 | -70 | -       | 21      | +                               | -3.5 | +7.3 | - |
| 1         |   | 52.0 | 51 | 56 | 250   | 44 | 110   | 12 | -71 | -       | 19      | +                               | -3.4 | +7.4 | - |
| 2         |   | 52.1 | 51 | 36 | 251   | 28 | 109   | 27 | -71 | -       | 17      | +                               | -3.3 | +7.5 | - |
| 3         |   | 52.1 | 51 | 17 | 252   | 14 | 108   | 42 | -71 | -       | 16      | +                               | -3.1 | +7.6 | - |
| 4         |   | 52.1 | 50 | 58 | 253   | 0  | 107   | 56 | -71 | -       | 14      | +                               | -3.0 | +7.7 | - |
| 5         |   | 52.2 | 50 | 41 | 253   | 47 | 107   | 9  | -72 | -       | 12      | +                               | -2.9 | +7.9 | - |
| 6         |   | 52.2 | 50 | 24 | 254   | 34 | 106   | 22 | -72 | -       | 10      | +                               | -2.7 | +8.0 | - |
| 7         |   | 52.2 | 50 | 8  | 255   | 22 | 105   | 34 | -72 | -       | 8       | +                               | -2.6 | +8.1 | - |
| 8         |   | 52.3 | 49 | 52 | 256   | 11 | 104   | 45 | -72 | -       | 6       | +                               | -2.5 | +8.2 | - |
| 9         |   | 52.3 | 49 | 38 | 257   | 0  | 103   | 56 | -72 | -       | 3       | +                               | -2.3 | +8.3 | - |
| 10        |   | 52.3 | 49 | 24 | 257   | 50 | 103   | 6  | -72 | -       | 1       | +                               | -2.2 | +8.4 | - |
| 11        |   | 52.4 | 49 | 12 | 258   | 41 | 102   | 16 | -72 | +       | 1       | -                               | -2.1 | +8.5 | - |
| 12        |   | 52.4 | 49 | 0  | 259   | 32 | 101   | 25 | -72 | +       | 3       | -                               | -1.9 | +8.5 | - |
| 13        |   | 52.4 | 48 | 49 | 260   | 23 | 100   | 34 | -72 | +       | 6       | -                               | -1.8 | +8.6 | - |
| 14        |   | 52.5 | 48 | 39 | 261   | 15 | 99    | 42 | -72 | +       | 8       | -                               | -1.6 | +8.7 | - |
| 15        |   | 52.5 | 48 | 30 | 262   | 8  | 98    | 50 | -72 | +       | 10      | -                               | -1.5 | +8.8 | - |
| 16        |   | 52.5 | 48 | 21 | 263   | 1  | 97    | 57 | -71 | +       | 12      | -                               | -1.3 | +8.8 | - |
| 17        |   | 52.6 | 48 | 14 | 263   | 54 | 97    | 5  | -71 | +       | 15      | -                               | -1.2 | +8.9 | - |
| 18        |   | 52.6 | 48 | 8  | 264   | 47 | 96    | 11 | -71 | +       | 17      | -                               | -1.0 | +8.9 | - |
| 19        |   | 52.6 | 48 | 2  | 265   | 41 | 95    | 18 | -71 | +       | 19      | -                               | -0.8 | +9.0 | - |
| +20       | 7 | 52.7 | 47 | 58 | 266   | 35 | 94    | 24 | -70 | +       | 21      | -                               | -0.7 | +9.1 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| +0        | +0.05      | -0.1       | +0.4         | +0.2         |
| 5         | 0.05       | -0.1       | 0.4          | 0.2          |
| 10        | 0.05       | 0.0        | 0.4          | 0.2          |
| 15        | 0.06       | 0.0        | 0.4          | 0.2          |
| +20       | +0.06      | 0.0        | +0.5         | +0.2         |



TABLE II.

| Pair No. | E | No. | Star           | Mag. | $\alpha_{1950}$ |      | $\delta_{1950}$ |        |
|----------|---|-----|----------------|------|-----------------|------|-----------------|--------|
|          |   |     |                |      | h               | m    | °               | '      |
| 71       | E | 98  | $\beta$ Leonis | 2.2  | 11              | 46   | 5               | +14 51 |
|          | W | 38  | $\gamma$ Tauri | 3.9  | 4               | 16.9 |                 | +15 31 |

| $\varphi$ | S |     | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |      |   |     |   |
|-----------|---|-----|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------|---|-----|---|
|           | h | m   | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | E    | W |     |   |
| +0        | 8 | 1.5 | 58 | 7  | 252   | 26 | 108   | 21 | -71 | -      | 15     | +                               | -3.1 | + | 5.9 | - |
| 1         |   | 1.5 | 57 | 49 | 253   | 2  | 107   | 46 | -72 | -      | 13     | +                               | -3.0 | + | 6.0 | - |
| 2         |   | 1.6 | 57 | 31 | 253   | 38 | 107   | 9  | -72 | -      | 12     | +                               | -2.9 | + | 6.1 | - |
| 3         |   | 1.6 | 57 | 14 | 254   | 15 | 106   | 33 | -72 | -      | 10     | +                               | -2.8 | + | 6.2 | - |
| 4         |   | 1.6 | 56 | 58 | 254   | 52 | 105   | 55 | -72 | -      | 8      | +                               | -2.7 | + | 6.3 | - |
| 5         |   | 1.6 | 56 | 42 | 255   | 30 | 105   | 17 | -72 | -      | 6      | +                               | -2.6 | + | 6.4 | - |
| 6         |   | 1.7 | 56 | 27 | 256   | 9  | 104   | 39 | -72 | -      | 5      | +                               | -2.5 | + | 6.4 | - |
| 7         |   | 1.7 | 56 | 13 | 256   | 48 | 104   | 0  | -72 | -      | 3      | +                               | -2.4 | + | 6.5 | - |
| 8         |   | 1.7 | 55 | 59 | 257   | 27 | 103   | 21 | -72 | -      | 1      | +                               | -2.2 | + | 6.6 | - |
| 9         |   | 1.7 | 55 | 46 | 258   | 7  | 102   | 42 | -72 | +      | 1      | -                               | -2.1 | + | 6.7 | - |
| 10        |   | 1.8 | 55 | 33 | 258   | 47 | 102   | 2  | -72 | +      | 3      | -                               | -2.0 | + | 6.7 | - |
| 11        |   | 1.8 | 55 | 21 | 259   | 27 | 101   | 21 | -72 | +      | 5      | -                               | -1.9 | + | 6.8 | - |
| 12        |   | 1.8 | 55 | 10 | 260   | 8  | 100   | 40 | -72 | +      | 6      | -                               | -1.8 | + | 6.9 | - |
| 13        |   | 1.9 | 55 | 0  | 260   | 50 | 99    | 59 | -72 | +      | 8      | -                               | -1.7 | + | 6.9 | - |
| 14        |   | 1.9 | 54 | 51 | 261   | 31 | 99    | 18 | -72 | +      | 10     | -                               | -1.5 | + | 7.0 | - |
| 15        |   | 1.9 | 54 | 42 | 262   | 13 | 98    | 36 | -72 | +      | 12     | -                               | -1.4 | + | 7.0 | - |
| 16        |   | 1.9 | 54 | 33 | 262   | 56 | 97    | 54 | -71 | +      | 14     | -                               | -1.3 | + | 7.1 | - |
| 17        |   | 2.0 | 54 | 26 | 263   | 38 | 97    | 11 | -71 | +      | 16     | -                               | -1.2 | + | 7.1 | - |
| 18        |   | 2.0 | 54 | 19 | 264   | 21 | 96    | 29 | -71 | +      | 18     | -                               | -1.1 | + | 7.2 | - |
| 19        |   | 2.0 | 54 | 13 | 265   | 4  | 95    | 46 | -71 | +      | 20     | -                               | -0.9 | + | 7.2 | - |
| +20       | 8 | 2.1 | 54 | 8  | 265   | 47 | 95    | 3  | -70 | +      | 22     | -                               | -0.8 | + | 7.2 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| +0        | +0.05      | -0.1       | +0.4         | +0.2         |
| 5         | 0.05       | 0.0        | 0.4          | 0.2          |
| 10        | 0.05       | 0.0        | 0.4          | 0.2          |
| 15        | 0.06       | 0.0        | 0.4          | 0.2          |
| +20       | +0.06      | 0.0        | +0.4         | +0.2         |

| Pair No. | E | No. | Star               | Mag. | $\alpha_{1950}$ |     | $\delta_{1950}$ |        |
|----------|---|-----|--------------------|------|-----------------|-----|-----------------|--------|
|          |   |     |                    |      | h               | m   | °               | '      |
| 72       | E | 92  | $\beta$ Crateris   | 4.5  | 11              | 9.2 |                 | -22 33 |
|          | W | 41  | $\epsilon$ Leporis | 3.3  | 5               | 3.3 |                 | -22 26 |

| $\varphi$ | S |     | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |      |   |     |   |
|-----------|---|-----|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------|---|-----|---|
|           | h | m   | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | E    | W |     |   |
| +0        | 8 | 6.4 | 50 | 23 | 299   | 51 | 60    | 18 | -65 | +      | 32     | -                               | +5.0 | + | 7.2 | - |
| 1         |   | 6.4 | 50 | 53 | 300   | 34 | 59    | 36 | -65 | +      | 33     | -                               | +5.1 | + | 7.0 | - |
| 2         |   | 6.4 | 51 | 24 | 301   | 15 | 58    | 54 | -64 | +      | 35     | -                               | +5.2 | + | 6.8 | - |
| 3         |   | 6.4 | 51 | 55 | 301   | 56 | 58    | 14 | -64 | +      | 36     | -                               | +5.3 | + | 6.7 | - |
| 4         |   | 6.4 | 52 | 27 | 302   | 35 | 57    | 34 | -63 | +      | 37     | -                               | +5.4 | + | 6.5 | - |
| 5         |   | 6.4 | 53 | 0  | 303   | 14 | 56    | 56 | -62 | +      | 38     | -                               | +5.5 | + | 6.3 | - |
| 6         |   | 6.4 | 53 | 33 | 303   | 51 | 56    | 19 | -62 | +      | 39     | -                               | +5.6 | + | 6.2 | - |
| 7         |   | 6.4 | 54 | 6  | 304   | 28 | 55    | 42 | -61 | +      | 40     | -                               | +5.7 | + | 6.0 | - |
| 8         |   | 6.4 | 54 | 41 | 305   | 3  | 55    | 7  | -61 | +      | 41     | -                               | +5.7 | + | 5.8 | - |
| 9         |   | 6.4 | 55 | 15 | 305   | 37 | 54    | 33 | -60 | +      | 42     | -                               | +5.8 | + | 5.7 | - |
| 10        |   | 6.4 | 55 | 50 | 306   | 11 | 53    | 59 | -59 | +      | 43     | -                               | +5.9 | + | 5.5 | - |
| 11        |   | 6.4 | 56 | 26 | 306   | 43 | 53    | 27 | -59 | +      | 44     | -                               | +6.0 | + | 5.3 | - |
| 12        |   | 6.4 | 57 | 2  | 307   | 15 | 52    | 55 | -58 | +      | 45     | -                               | +6.0 | + | 5.2 | - |
| 13        |   | 6.4 | 57 | 38 | 307   | 45 | 52    | 25 | -58 | +      | 46     | -                               | +6.1 | + | 5.0 | - |
| 14        |   | 6.4 | 58 | 15 | 308   | 15 | 51    | 55 | -57 | +      | 47     | -                               | +6.2 | + | 4.9 | - |
| 15        |   | 6.5 | 58 | 52 | 308   | 44 | 51    | 26 | -56 | +      | 47     | -                               | +6.3 | + | 4.7 | - |
| 16        |   | 6.5 | 59 | 30 | 309   | 12 | 50    | 59 | -56 | +      | 48     | -                               | +6.3 | + | 4.6 | - |
| 17        |   | 6.5 | 60 | 8  | 309   | 39 | 50    | 32 | -55 | +      | 49     | -                               | +6.4 | + | 4.4 | - |
| 18        |   | 6.5 | 60 | 47 | 310   | 5  | 50    | 6  | -54 | +      | 49     | -                               | +6.4 | + | 4.3 | - |
| 19        |   | 6.5 | 61 | 25 | 310   | 30 | 49    | 40 | -54 | +      | 50     | -                               | +6.5 | + | 4.2 | - |
| +20       | 8 | 6.5 | 62 | 4  | 310   | 55 | 49    | 16 | -53 | +      | 51     | -                               | +6.5 | + | 4.0 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| +0        | +0.05      | +0.1       | +0.4         | +0.2         |
| 5         | 0.05       | 0.1        | 0.4          | 0.2          |
| 10        | 0.05       | 0.1        | 0.4          | 0.2          |
| 15        | 0.06       | 0.1        | 0.4          | 0.2          |
| +20       | +0.06      | +0.1       | +0.4         | +0.2         |



TABLE II.

|             | No.  | Star            | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|------|-----------------|------|---------------------------|---------------------------|
|             |      |                 |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 73 | E 90 | $\nu$ Hydrae    | 3.3  | 10 47.2                   | -15 56                    |
|             | W 54 | $\zeta$ Leporis | 3.7  | 5 44.7                    | -14 50                    |

| $\varphi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |              |              |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|---------------------------------|--------------|--------------|
|           | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                      | $\Delta A_E$ | $\Delta A_W$ |
| +0        | 8            | 16.7         | 40           | 57           | 294          | 46           | 67           | 1            | -68 | +36    | -      | +4.1                            | +10.5        | -            |
| 1         |              | 16.8         | 41           | 22           | 295          | 49           | 65           | 59           | -68 | +38    | -      | +4.2                            | +10.3        | -            |
| 2         |              | 16.8         | 41           | 48           | 296          | 50           | 64           | 58           | -67 | +41    | -      | +4.4                            | +10.1        | -            |
| 3         |              | 16.9         | 42           | 14           | 297          | 49           | 63           | 58           | -67 | +43    | -      | +4.5                            | +9.8         | -            |
| 4         |              | 16.9         | 42           | 42           | 298          | 48           | 63           | 0            | -66 | +44    | -      | +4.7                            | +9.6         | -            |
| 5         |              | 17.0         | 43           | 10           | 299          | 44           | 62           | 3            | -65 | +46    | -      | +4.8                            | +9.3         | -            |
| 6         |              | 17.1         | 43           | 40           | 300          | 40           | 61           | 8            | -65 | +48    | -      | +5.0                            | +9.1         | -            |
| 7         |              | 17.1         | 44           | 10           | 301          | 34           | 60           | 14           | -64 | +50    | -      | +5.1                            | +8.9         | -            |
| 8         |              | 17.2         | 44           | 41           | 302          | 26           | 59           | 22           | -63 | +51    | -      | +5.2                            | +8.6         | -            |
| 9         |              | 17.3         | 45           | 13           | 303          | 17           | 58           | 31           | -62 | +52    | -      | +5.4                            | +8.4         | -            |
| 10        |              | 17.3         | 45           | 45           | 304          | 7            | 57           | 42           | -61 | +54    | -      | +5.5                            | +8.2         | -            |
| 11        |              | 17.4         | 46           | 19           | 304          | 55           | 56           | 54           | -61 | +55    | -      | +5.6                            | +8.0         | -            |
| 12        |              | 17.5         | 46           | 52           | 305          | 42           | 56           | 7            | -60 | +56    | -      | +5.7                            | +7.7         | -            |
| 13        |              | 17.5         | 47           | 27           | 306          | 28           | 55           | 22           | -59 | +57    | -      | +5.8                            | +7.5         | -            |
| 14        |              | 17.6         | 48           | 2            | 307          | 12           | 54           | 38           | -58 | +58    | -      | +5.9                            | +7.3         | -            |
| 15        |              | 17.7         | 48           | 38           | 307          | 56           | 53           | 55           | -57 | +59    | -      | +6.0                            | +7.1         | -            |
| 16        |              | 17.7         | 49           | 14           | 308          | 37           | 53           | 14           | -57 | +60    | -      | +6.1                            | +6.9         | -            |
| 17        |              | 17.8         | 49           | 51           | 309          | 18           | 52           | 34           | -56 | +60    | -      | +6.2                            | +6.7         | -            |
| 18        |              | 17.9         | 50           | 29           | 309          | 57           | 51           | 55           | -55 | +61    | -      | +6.3                            | +6.5         | -            |
| 19        |              | 17.9         | 51           | 7            | 310          | 36           | 51           | 18           | -54 | +62    | -      | +6.4                            | +6.3         | -            |
| +20       | 8            | 18.0         | 51           | 46           | 311          | 13           | 50           | 41           | -53 | +62    | -      | +6.5                            | +6.1         | -            |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| +0        | +0.05      | +0.1       | +0.5         | +0.1         |
| 5         | 0.05       | 0.1        | 0.5          | 0.1          |
| 10        | 0.05       | 0.1        | 0.4          | 0.1          |
| 15        | 0.06       | 0.1        | 0.4          | 0.2          |
| +20       | +0.06      | +0.1       | +0.4         | +0.2         |

|             | No.  | Star            | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|------|-----------------|------|---------------------------|---------------------------|
|             |      |                 |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 74 | E 93 | $\delta$ Leonis | 2.6  | 11 11.5                   | +20 48                    |
|             | W 53 | $\zeta$ Tauri   | 3.0  | 5 34.7                    | +21 7                     |

| $\varphi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |              |              |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|---------------------------------|--------------|--------------|
|           | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                      | $\Delta A_E$ | $\Delta A_W$ |
| +0        | 8            | 22.8         | 46           | 41           | 240          | 48           | 119          | 40           | -65 | -36    | +      | -4.9                            | +8.1         | -            |
| 1         |              | 22.8         | 46           | 12           | 241          | 37           | 118          | 51           | -66 | -34    | +      | -4.8                            | +8.4         | -            |
| 2         |              | 22.8         | 45           | 44           | 242          | 28           | 118          | 0            | -66 | -32    | +      | -4.7                            | +8.6         | -            |
| 3         |              | 22.8         | 45           | 16           | 243          | 21           | 117          | 7            | -67 | -31    | +      | -4.5                            | +8.9         | -            |
| 4         |              | 22.8         | 44           | 49           | 244          | 14           | 116          | 14           | -67 | -29    | +      | -4.4                            | +9.1         | -            |
| 5         |              | 22.9         | 44           | 23           | 245          | 10           | 115          | 19           | -68 | -27    | +      | -4.2                            | +9.3         | -            |
| 6         |              | 22.9         | 43           | 58           | 246          | 6            | 114          | 23           | -68 | -25    | +      | -4.1                            | +9.5         | -            |
| 7         |              | 22.9         | 43           | 34           | 247          | 3            | 113          | 25           | -68 | -22    | +      | -3.9                            | +9.7         | -            |
| 8         |              | 22.9         | 43           | 11           | 248          | 2            | 112          | 27           | -69 | -20    | +      | -3.8                            | +9.9         | -            |
| 9         |              | 22.9         | 42           | 49           | 249          | 2            | 111          | 27           | -69 | -18    | +      | -3.6                            | +10.1        | -            |
| 10        |              | 22.9         | 42           | 28           | 250          | 3            | 110          | 26           | -69 | -16    | +      | -3.5                            | +10.3        | -            |
| 11        |              | 23.0         | 42           | 7            | 251          | 5            | 109          | 24           | -69 | -13    | +      | -3.3                            | +10.5        | -            |
| 12        |              | 23.0         | 41           | 48           | 252          | 8            | 108          | 21           | -70 | -11    | +      | -3.1                            | +10.6        | -            |
| 13        |              | 23.0         | 41           | 30           | 253          | 13           | 107          | 17           | -70 | -8     | +      | -2.9                            | +10.8        | -            |
| 14        |              | 23.0         | 41           | 13           | 254          | 18           | 106          | 11           | -70 | -5     | +      | -2.8                            | +11.0        | -            |
| 15        |              | 23.0         | 40           | 57           | 255          | 24           | 105          | 5            | -70 | -2     | +      | -2.6                            | +11.1        | -            |
| 16        |              | 23.1         | 40           | 42           | 256          | 31           | 103          | 58           | -70 | 0      |        | -2.4                            | +11.3        | -            |
| 17        |              | 23.1         | 40           | 29           | 257          | 40           | 102          | 50           | -70 | +3     | -      | -2.2                            | +11.4        | -            |
| 18        |              | 23.1         | 40           | 16           | 258          | 49           | 101          | 41           | -70 | +6     | -      | -2.0                            | +11.6        | -            |
| 19        |              | 23.1         | 40           | 5            | 259          | 59           | 100          | 31           | -70 | +9     | -      | -1.8                            | +11.7        | -            |
| +20       | 8            | 23.1         | 39           | 55           | 261          | 9            | 99           | 21           | -70 | +12    | -      | -1.6                            | +11.7        | -            |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| +0        | +0.05      | -0.1       | +0.4         | +0.1         |
| 5         | 0.05       | 0.1        | 0.5          | 0.1          |
| 10        | 0.05       | 0.1        | 0.5          | 0.1          |
| 15        | 0.06       | -0.1       | 0.5          | 0.1          |
| +20       | +0.06      | 0.0        | +0.5         | +0.1         |



TABLE II.

|             | No.   | Star                | Mag.    | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|-------|---------------------|---------|---------------------------|---------------------------|
|             |       |                     |         | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 75 | E 107 | $\epsilon$ Virginis | 3.0     | 12 59.7                   | +11 14                    |
|             | W 35  | $\lambda$ Tauri     | 3.8-4.2 | 3 57.9                    | +12 21                    |

| $\varphi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |              |              |   |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|---------------------------------|--------------|--------------|---|
|           | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                      | $\Delta A_E$ | $\Delta A_W$ |   |
| +0        | 8            | 28.6         | 68           | 50           | 257          | 57           | 103          | 16           | -73 | -      | 7      | +                               | -2.2         | +3.8         | - |
| 1         |              | 28.7         | 68           | 37           | 258          | 20           | 102          | 53           | -73 | -      | 5      | +                               | -2.1         | +3.8         | - |
| 2         |              | 28.7         | 68           | 24           | 258          | 43           | 102          | 30           | -73 | -      | 4      | +                               | -2.1         | +3.9         | - |
| 3         |              | 28.7         | 68           | 12           | 259          | 6            | 102          | 6            | -73 | -      | 2      | +                               | -2.0         | +3.9         | - |
| 4         |              | 28.8         | 68           | 0            | 259          | 30           | 101          | 43           | -73 | -      | 1      | +                               | -1.9         | +4.0         | - |
| 5         |              | 28.8         | 67           | 49           | 259          | 54           | 101          | 19           | -73 | +      | 1      | -                               | -1.9         | +4.0         | - |
| 6         |              | 28.9         | 67           | 38           | 260          | 18           | 100          | 55           | -73 | +      | 2      | -                               | -1.8         | +4.1         | - |
| 7         |              | 28.9         | 67           | 27           | 260          | 43           | 100          | 31           | -73 | +      | 4      | -                               | -1.7         | +4.1         | - |
| 8         |              | 29.0         | 67           | 17           | 261          | 8            | 100          | 6            | -73 | +      | 5      | -                               | -1.6         | +4.1         | - |
| 9         |              | 29.0         | 67           | 8            | 261          | 33           | 99           | 41           | -73 | +      | 7      | -                               | -1.6         | +4.2         | - |
| 10        |              | 29.0         | 66           | 58           | 261          | 58           | 99           | 16           | -73 | +      | 8      | -                               | -1.5         | +4.2         | - |
| 11        |              | 29.1         | 66           | 50           | 262          | 23           | 98           | 51           | -73 | +      | 10     | -                               | -1.4         | +4.3         | - |
| 12        |              | 29.1         | 66           | 41           | 262          | 49           | 98           | 26           | -73 | +      | 11     | -                               | -1.4         | +4.3         | - |
| 13        |              | 29.2         | 66           | 33           | 263          | 15           | 98           | 0            | -73 | +      | 13     | -                               | -1.3         | +4.3         | - |
| 14        |              | 29.2         | 66           | 26           | 263          | 41           | 97           | 34           | -72 | +      | 14     | -                               | -1.2         | +4.4         | - |
| 15        |              | 29.3         | 66           | 19           | 264          | 7            | 97           | 9            | -72 | +      | 16     | -                               | -1.1         | +4.4         | - |
| 16        |              | 29.3         | 66           | 12           | 264          | 33           | 96           | 43           | -72 | +      | 17     | -                               | -1.1         | +4.4         | - |
| 17        |              | 29.4         | 66           | 6            | 265          | 0            | 96           | 16           | -71 | +      | 19     | -                               | -1.0         | +4.4         | - |
| 18        |              | 29.4         | 66           | 0            | 265          | 27           | 95           | 50           | -71 | +      | 20     | -                               | -0.9         | +4.5         | - |
| 19        |              | 29.4         | 65           | 55           | 265          | 54           | 95           | 24           | -71 | +      | 22     | -                               | -0.8         | +4.5         | - |
| +20       | 8            | 29.5         | 65           | 50           | 266          | 21           | 94           | 57           | -70 | +      | 23     | -                               | -0.7         | +4.5         | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| +0        | +0.05      | 0.0        | +0.4         | +0.2         |
| 5         | 0.05       | 0.0        | 0.4          | 0.2          |
| 10        | 0.05       | 0.0        | 0.4          | 0.2          |
| 15        | 0.06       | 0.0        | 0.4          | 0.2          |
| +20       | +0.06      | 0.0        | +0.4         | +0.2         |

|             | No.  | Star              | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|------|-------------------|------|---------------------------|---------------------------|
|             |      |                   |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 76 | E 96 | $\delta$ Crateris | 3.8  | 11 16.8                   | -14 30                    |
|             | W 57 | $\eta$ Leporis    | 3.8  | 5 54.1                    | -14 11                    |

| $\varphi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |              |              |   |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|---------------------------------|--------------|--------------|---|
|           | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                      | $\Delta A_E$ | $\Delta A_W$ |   |
| +0        | 8            | 35.7         | 42           | 59           | 291          | 33           | 68           | 57           | -70 | +      | 30     | -                               | +3.6         | +10.0        | - |
| 1         |              | 35.7         | 43           | 21           | 292          | 33           | 67           | 58           | -69 | +      | 33     | -                               | +3.8         | +9.8         | - |
| 2         |              | 35.7         | 43           | 44           | 293          | 31           | 67           | 0            | -69 | +      | 35     | -                               | +4.0         | +9.6         | - |
| 3         |              | 35.7         | 44           | 9            | 294          | 28           | 66           | 3            | -68 | +      | 37     | -                               | +4.1         | +9.4         | - |
| 4         |              | 35.8         | 44           | 34           | 295          | 24           | 65           | 7            | -68 | +      | 39     | -                               | +4.2         | +9.2         | - |
| 5         |              | 35.8         | 44           | 59           | 296          | 19           | 64           | 13           | -67 | +      | 40     | -                               | +4.4         | +9.0         | - |
| 6         |              | 35.8         | 45           | 26           | 297          | 12           | 63           | 19           | -66 | +      | 42     | -                               | +4.5         | +8.8         | - |
| 7         |              | 35.8         | 45           | 54           | 298          | 4            | 62           | 27           | -66 | +      | 44     | -                               | +4.7         | +8.6         | - |
| 8         |              | 35.8         | 46           | 22           | 298          | 55           | 61           | 36           | -65 | +      | 45     | -                               | +4.8         | +8.4         | - |
| 9         |              | 35.8         | 46           | 51           | 299          | 44           | 60           | 47           | -64 | +      | 47     | -                               | +4.9         | +8.2         | - |
| 10        |              | 35.9         | 47           | 21           | 300          | 33           | 59           | 59           | -63 | +      | 48     | -                               | +5.0         | +8.0         | - |
| 11        |              | 35.9         | 47           | 52           | 301          | 20           | 59           | 12           | -63 | +      | 50     | -                               | +5.2         | +7.8         | - |
| 12        |              | 35.9         | 48           | 23           | 302          | 6            | 58           | 26           | -62 | +      | 51     | -                               | +5.3         | +7.6         | - |
| 13        |              | 35.9         | 48           | 55           | 302          | 51           | 57           | 41           | -61 | +      | 52     | -                               | +5.4         | +7.4         | - |
| 14        |              | 35.9         | 49           | 28           | 303          | 34           | 56           | 58           | -60 | +      | 53     | -                               | +5.5         | +7.2         | - |
| 15        |              | 36.0         | 50           | 1            | 304          | 16           | 56           | 15           | -60 | +      | 54     | -                               | +5.6         | +7.0         | - |
| 16        |              | 36.0         | 50           | 35           | 304          | 58           | 55           | 34           | -59 | +      | 55     | -                               | +5.7         | +6.8         | - |
| 17        |              | 36.0         | 51           | 9            | 305          | 38           | 54           | 55           | -58 | +      | 56     | -                               | +5.8         | +6.6         | - |
| 18        |              | 36.0         | 51           | 44           | 306          | 17           | 54           | 16           | -57 | +      | 57     | -                               | +5.9         | +6.4         | - |
| 19        |              | 36.0         | 52           | 20           | 306          | 55           | 53           | 38           | -56 | +      | 58     | -                               | +6.0         | +6.2         | - |
| +20       | 8            | 36.1         | 52           | 56           | 307          | 31           | 53           | 2            | -56 | +      | 59     | -                               | +6.1         | +6.0         | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| +0        | +0.05      | +0.1       | +0.5         | +0.1         |
| 5         | 0.05       | 0.1        | 0.5          | 0.1          |
| 10        | 0.05       | 0.1        | 0.4          | 0.1          |
| 15        | 0.06       | 0.1        | 0.4          | 0.1          |
| +20       | +0.06      | +0.1       | +0.4         | +0.2         |



TABLE II.

|             | No.   | Star           | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|-------|----------------|------|---------------------------|---------------------------|
|             |       |                |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 77 | E 104 | $\delta$ Corvi | 3.1  | 12 27.3                   | -16 14                    |
|             | W 43  | $\mu$ Leporis  | 3.3  | 5 10.7                    | -16 16                    |

| $\varphi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|---------------------------------|------------|---|
|           | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                      | $\Delta A$ | E |
| +0        | 8            | 49.0         | 56           | 47           | 289          | 31           | 70           | 27           | -71 | +17    | -      | +3.4                            | +6.2       | - |
| 1         |              | 49.0         | 57           | 7            | 290          | 8            | 69           | 50           | -70 | +19    | -      | +3.4                            | +6.1       | - |
| 2         |              | 49.0         | 57           | 28           | 290          | 44           | 69           | 14           | -70 | +20    | -      | +3.5                            | +6.0       | - |
| 3         |              | 49.0         | 57           | 49           | 291          | 20           | 68           | 38           | -70 | +22    | -      | +3.6                            | +5.9       | - |
| 4         |              | 49.0         | 58           | 12           | 291          | 55           | 68           | 3            | -69 | +23    | -      | +3.7                            | +5.8       | - |
| 5         |              | 49.0         | 58           | 34           | 292          | 29           | 67           | 29           | -69 | +25    | -      | +3.8                            | +5.7       | - |
| 6         |              | 49.0         | 58           | 57           | 293          | 2            | 66           | 56           | -69 | +26    | -      | +3.9                            | +5.5       | - |
| 7         |              | 49.0         | 59           | 21           | 293          | 35           | 66           | 23           | -68 | +27    | -      | +4.0                            | +5.4       | - |
| 8         |              | 49.0         | 59           | 45           | 294          | 8            | 65           | 51           | -68 | +29    | -      | +4.1                            | +5.3       | - |
| 9         |              | 49.0         | 60           | 10           | 294          | 39           | 65           | 19           | -67 | +30    | -      | +4.2                            | +5.2       | - |
| 10        |              | 49.0         | 60           | 36           | 295          | 10           | 64           | 48           | -67 | +31    | -      | +4.3                            | +5.1       | - |
| 11        |              | 49.0         | 61           | 1            | 295          | 40           | 64           | 18           | -66 | +33    | -      | +4.3                            | +5.0       | - |
| 12        |              | 49.0         | 61           | 28           | 296          | 10           | 63           | 48           | -66 | +34    | -      | +4.4                            | +4.9       | - |
| 13        |              | 49.0         | 61           | 54           | 296          | 39           | 63           | 19           | -65 | +35    | -      | +4.5                            | +4.8       | - |
| 14        |              | 49.0         | 62           | 21           | 297          | 7            | 62           | 51           | -65 | +36    | -      | +4.6                            | +4.7       | - |
| 15        |              | 49.0         | 62           | 49           | 297          | 35           | 62           | 23           | -64 | +37    | -      | +4.6                            | +4.6       | - |
| 16        |              | 49.0         | 63           | 17           | 298          | 2            | 61           | 56           | -63 | +38    | -      | +4.7                            | +4.4       | - |
| 17        |              | 49.0         | 63           | 46           | 298          | 28           | 61           | 30           | -63 | +39    | -      | +4.8                            | +4.3       | - |
| 18        |              | 49.0         | 64           | 14           | 298          | 54           | 61           | 4            | -62 | +40    | -      | +4.8                            | +4.2       | - |
| 19        |              | 49.0         | 64           | 43           | 299          | 19           | 60           | 39           | -62 | +41    | -      | +4.9                            | +4.1       | - |
| +20       | 8            | 49.0         | 65           | 13           | 299          | 43           | 60           | 15           | -61 | +42    | -      | +5.0                            | +4.0       | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$    | $\delta S$   | $\delta z$   | $\delta A_E$ | $\delta A_W$ |
|--------------|--------------|--------------|--------------|--------------|
| <sup>°</sup> | <sup>m</sup> | <sup>'</sup> | <sup>'</sup> | <sup>'</sup> |
| +0           | +0.05        | +0.1         | +0.4         | +0.1         |
| 5            | 0.05         | 0.1          | 0.4          | 0.1          |
| 10           | 0.05         | 0.1          | 0.4          | 0.1          |
| 15           | 0.06         | 0.1          | 0.4          | 0.2          |
| +20          | +0.06        | +0.1         | +0.4         | +0.2         |

DATA REQUIRED FOR OBSERVATION.

|             | No.   | Star               | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|-------|--------------------|------|---------------------------|---------------------------|
|             |       |                    |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 78 | E 103 | $\eta$ Virginis    | 4.0  | 12 17.3                   | -0 23                     |
|             | W 52  | $\epsilon$ Orionis | 1.8  | 5 33.7                    | -1 14                     |

| $\varphi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|---------------------------------|------------|---|
|           | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                      | $\Delta A$ | E |
| +0        | 8            | 55.5         | 51           | 5            | 270          | 30           | 88           | 25           | -75 | +1     | -      | +0.2                            | +8.1       | - |
| 1         |              | 55.5         | 51           | 7            | 271          | 18           | 87           | 36           | -75 | +4     | -      | +0.3                            | +8.1       | - |
| 2         |              | 55.4         | 51           | 9            | 272          | 6            | 86           | 48           | -75 | +6     | -      | +0.5                            | +8.0       | - |
| 3         |              | 55.4         | 51           | 12           | 272          | 54           | 86           | 0            | -75 | +8     | -      | +0.6                            | +8.0       | - |
| 4         |              | 55.3         | 51           | 17           | 273          | 42           | 85           | 12           | -75 | +10    | -      | +0.8                            | +8.0       | - |
| 5         |              | 55.3         | 51           | 21           | 274          | 30           | 84           | 24           | -75 | +12    | -      | +0.9                            | +8.0       | - |
| 6         |              | 55.3         | 51           | 27           | 275          | 18           | 83           | 36           | -74 | +14    | -      | +1.0                            | +7.9       | - |
| 7         |              | 55.2         | 51           | 34           | 276          | 5            | 82           | 49           | -74 | +16    | -      | +1.2                            | +7.9       | - |
| 8         |              | 55.2         | 51           | 41           | 276          | 52           | 82           | 1            | -74 | +18    | -      | +1.3                            | +7.8       | - |
| 9         |              | 55.2         | 51           | 49           | 277          | 39           | 81           | 14           | -73 | +20    | -      | +1.4                            | +7.8       | - |
| 10        |              | 55.1         | 51           | 58           | 278          | 26           | 80           | 28           | -73 | +22    | -      | +1.6                            | +7.7       | - |
| 11        |              | 55.1         | 52           | 8            | 279          | 12           | 79           | 41           | -72 | +24    | -      | +1.7                            | +7.7       | - |
| 12        |              | 55.0         | 52           | 18           | 279          | 58           | 78           | 56           | -72 | +26    | -      | +1.8                            | +7.6       | - |
| 13        |              | 55.0         | 52           | 30           | 280          | 43           | 78           | 10           | -72 | +28    | -      | +2.0                            | +7.5       | - |
| 14        |              | 54.9         | 52           | 42           | 281          | 28           | 77           | 25           | -71 | +30    | -      | +2.1                            | +7.4       | - |
| 15        |              | 54.9         | 52           | 55           | 282          | 12           | 76           | 40           | -71 | +32    | -      | +2.2                            | +7.4       | - |
| 16        |              | 54.9         | 53           | 8            | 282          | 56           | 75           | 56           | -70 | +34    | -      | +2.3                            | +7.3       | - |
| 17        |              | 54.8         | 53           | 23           | 283          | 39           | 75           | 13           | -70 | +36    | -      | +2.5                            | +7.2       | - |
| 18        |              | 54.8         | 53           | 38           | 284          | 22           | 74           | 29           | -69 | +37    | -      | +2.6                            | +7.1       | - |
| 19        |              | 54.7         | 53           | 54           | 285          | 4            | 73           | 47           | -68 | +39    | -      | +2.7                            | +7.0       | - |
| +20       | 8            | 54.7         | 54           | 10           | 285          | 46           | 73           | 5            | -67 | +41    | -      | +2.8                            | +6.9       | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$    | $\delta S$   | $\delta z$   | $\delta A_E$ | $\delta A_W$ |
|--------------|--------------|--------------|--------------|--------------|
| <sup>°</sup> | <sup>m</sup> | <sup>'</sup> | <sup>'</sup> | <sup>'</sup> |
| +0           | +0.05        | 0.0          | +0.4         | +0.1         |
| 5            | 0.05         | 0.0          | 0.4          | 0.1          |
| 10           | 0.05         | 0.0          | 0.4          | 0.1          |
| 15           | 0.06         | +0.1         | 0.4          | 0.1          |
| +20          | +0.06        | +0.1         | +0.4         | +0.1         |



TABLE II.

|             | No.   | Star              | Mag. | $\alpha_{1950}$ | $\delta_{1950}$ |
|-------------|-------|-------------------|------|-----------------|-----------------|
| Pair No. 79 | E 105 | $\gamma$ Virginis | 2.9  | 12 39.1         | -1 11           |
|             | W 49  | $\delta$ Orionis  | 2.5  | 5 29.5          | -0 20           |

| $\varphi$ | S |     | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|---|-----|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------------|---|
|           | h | m   | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | $\Delta A$ | E |
| +0        | 9 | 4.3 | 54 | 20 | 271   | 27 | 89    | 36 | -75 | +1     | -      | +0.2                            | +7.2       | - |
| 1         |   | 4.4 | 54 | 22 | 272   | 10 | 88    | 53 | -75 | +3     | -      | +0.3                            | +7.2       | - |
| 2         |   | 4.4 | 54 | 24 | 272   | 53 | 88    | 10 | -75 | +5     | -      | +0.4                            | +7.2       | - |
| 3         |   | 4.4 | 54 | 27 | 273   | 36 | 87    | 27 | -75 | +7     | -      | +0.5                            | +7.1       | - |
| 4         |   | 4.5 | 54 | 30 | 274   | 19 | 86    | 44 | -75 | +9     | -      | +0.7                            | +7.1       | - |
| 5         |   | 4.5 | 54 | 35 | 275   | 1  | 86    | 2  | -75 | +11    | -      | +0.8                            | +7.1       | - |
| 6         |   | 4.5 | 54 | 40 | 275   | 44 | 85    | 19 | -74 | +13    | -      | +0.9                            | +7.1       | - |
| 7         |   | 4.6 | 54 | 46 | 276   | 26 | 84    | 37 | -74 | +15    | -      | +1.0                            | +7.0       | - |
| 8         |   | 4.6 | 54 | 52 | 277   | 8  | 83    | 55 | -74 | +17    | -      | +1.1                            | +7.0       | - |
| 9         |   | 4.6 | 54 | 59 | 277   | 50 | 83    | 13 | -73 | +19    | -      | +1.3                            | +7.0       | - |
| 10        |   | 4.7 | 55 | 7  | 278   | 32 | 82    | 32 | -73 | +20    | -      | +1.4                            | +6.9       | - |
| 11        |   | 4.7 | 55 | 16 | 279   | 13 | 81    | 51 | -73 | +22    | -      | +1.5                            | +6.9       | - |
| 12        |   | 4.8 | 55 | 25 | 279   | 54 | 81    | 10 | -72 | +24    | -      | +1.6                            | +6.8       | - |
| 13        |   | 4.8 | 55 | 36 | 280   | 35 | 80    | 29 | -72 | +26    | -      | +1.8                            | +6.8       | - |
| 14        |   | 4.8 | 55 | 46 | 281   | 15 | 79    | 49 | -72 | +28    | -      | +1.9                            | +6.7       | - |
| 15        |   | 4.9 | 55 | 58 | 281   | 56 | 79    | 9  | -71 | +30    | -      | +2.0                            | +6.7       | - |
| 16        |   | 4.9 | 56 | 10 | 282   | 35 | 78    | 30 | -71 | +31    | -      | +2.1                            | +6.6       | - |
| 17        |   | 5.0 | 56 | 23 | 283   | 15 | 77    | 51 | -70 | +33    | -      | +2.2                            | +6.5       | - |
| 18        |   | 5.0 | 56 | 36 | 283   | 53 | 77    | 12 | -69 | +35    | -      | +2.3                            | +6.4       | - |
| 19        |   | 5.0 | 56 | 51 | 284   | 32 | 76    | 34 | -69 | +36    | -      | +2.4                            | +6.4       | - |
| +20       | 9 | 5.1 | 57 | 5  | 285   | 10 | 75    | 57 | -68 | +38    | -      | +2.5                            | +6.3       | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| +0        | +0.05      | 0.0        | +0.4         | +0.1         |
| 5         | 0.05       | 0.0        | 0.4          | 0.1          |
| 10        | 0.05       | 0.0        | 0.4          | 0.1          |
| 15        | 0.06       | +0.1       | 0.4          | 0.1          |
| +20       | +0.06      | +0.1       | +0.4         | +0.1         |

DATA REQUIRED FOR OBSERVATION.

|             | No.  | Star               | Mag. | $\alpha_{1950}$ | $\delta_{1950}$ |
|-------------|------|--------------------|------|-----------------|-----------------|
| Pair No. 80 | E 94 | $\theta$ Leonis    | 3.4  | 11 11.6         | +15 42          |
|             | W 67 | $\lambda$ Geminor. | 3.7  | 7 15.2          | +16 38          |

| $\varphi$ | S |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|---|------|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------------|---|
|           | h | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | $\Delta A$ | E |
| +0        | 9 | 12.5 | 33 | 52 | 240   | 58 | 120   | 55 | -65 | -58    | +      | -5.0                            | +12.9      | - |
| 1         |   | 12.5 | 33 | 23 | 242   | 17 | 119   | 36 | -66 | -55    | +      | -4.8                            | +13.3      | - |
| 2         |   | 12.6 | 32 | 55 | 243   | 38 | 118   | 15 | -66 | -53    | +      | -4.6                            | +13.7      | - |
| 3         |   | 12.7 | 32 | 28 | 245   | 2  | 116   | 52 | -67 | -50    | +      | -4.4                            | +14.2      | - |
| 4         |   | 12.7 | 32 | 2  | 246   | 28 | 115   | 26 | -68 | -46    | +      | -4.1                            | +14.6      | - |
| 5         |   | 12.8 | 31 | 38 | 247   | 57 | 113   | 57 | -69 | -43    | +      | -3.9                            | +15.0      | - |
| 6         |   | 12.9 | 31 | 15 | 249   | 28 | 112   | 26 | -69 | -39    | +      | -3.7                            | +15.4      | - |
| 7         |   | 12.9 | 30 | 54 | 251   | 1  | 110   | 53 | -70 | -35    | +      | -3.4                            | +15.7      | - |
| 8         |   | 13.0 | 30 | 34 | 252   | 36 | 109   | 18 | -70 | -31    | +      | -3.1                            | +16.1      | - |
| 9         |   | 13.1 | 30 | 16 | 254   | 14 | 107   | 41 | -71 | -26    | +      | -2.9                            | +16.4      | - |
| 10        |   | 13.1 | 30 | 0  | 255   | 53 | 106   | 2  | -71 | -21    | +      | -2.6                            | +16.8      | - |
| 11        |   | 13.2 | 29 | 45 | 257   | 35 | 104   | 20 | -72 | -17    | +      | -2.3                            | +17.1      | - |
| 12        |   | 13.3 | 29 | 32 | 259   | 18 | 102   | 38 | -72 | -11    | +      | -2.0                            | +17.3      | - |
| 13        |   | 13.3 | 29 | 21 | 261   | 2  | 100   | 54 | -72 | -6     | +      | -1.7                            | +17.5      | - |
| 14        |   | 13.4 | 29 | 12 | 262   | 48 | 99    | 8  | -72 | -1     | +      | -1.4                            | +17.7      | - |
| 15        |   | 13.5 | 29 | 4  | 264   | 35 | 97    | 22 | -72 | +5     | -      | -1.1                            | +17.9      | - |
| 16        |   | 13.6 | 28 | 58 | 266   | 23 | 95    | 34 | -72 | +10    | -      | -0.8                            | +18.0      | - |
| 17        |   | 13.6 | 28 | 54 | 268   | 12 | 93    | 47 | -72 | +16    | -      | -0.5                            | +18.1      | - |
| 18        |   | 13.7 | 28 | 52 | 270   | 0  | 91    | 59 | -71 | +21    | -      | -0.2                            | +18.2      | - |
| 19        |   | 13.8 | 28 | 52 | 271   | 49 | 90    | 10 | -71 | +27    | -      | +0.2                            | +18.2      | - |
| +20       | 9 | 13.8 | 28 | 54 | 273   | 39 | 88    | 21 | -70 | +32    | -      | +0.5                            | +18.3      | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| +0        | +0.05      | -0.1       | +0.6         | -0.1         |
| 5         | 0.05       | 0.1        | 0.6          | 0.2          |
| 10        | 0.05       | -0.1       | 0.7          | 0.2          |
| 15        | 0.06       | 0.0        | 0.7          | 0.2          |
| +20       | +0.06      | 0.0        | +0.7         | -0.2         |



TABLE II.

|             | No.   | Star               | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|-------|--------------------|------|---------------------------|---------------------------|
|             |       |                    |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 81 | E 102 | $\gamma$ Corvi     | 2.8  | 12 13.2                   | -17 16                    |
|             | W 60  | $\beta$ Canis Maj. | 2.0  | 6 20.5                    | -17 56                    |

| $\varphi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|---------------------------------|------------|---|
|           | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                      | $\Delta A$ | E |
| + 0       | 9            | 16.4         | 47           | 22           | 293          | 47           | 65           | 16           | -68 | + 29   | -      | +4.1                            | + 8.4      | - |
| 1         |              | 16.4         | 47           | 47           | 294          | 37           | 64           | 26           | -68 | + 31   | -      | +4.3                            | + 8.2      | - |
| 2         |              | 16.4         | 48           | 13           | 295          | 26           | 63           | 37           | -67 | + 33   | -      | +4.4                            | + 8.0      | - |
| 3         |              | 16.3         | 48           | 39           | 296          | 13           | 62           | 49           | -67 | + 35   | -      | +4.5                            | + 7.9      | - |
| 4         |              | 16.3         | 49           | 7            | 297          | 0            | 62           | 3            | -66 | + 36   | -      | +4.6                            | + 7.7      | - |
| 5         |              | 16.3         | 49           | 35           | 297          | 45           | 61           | 17           | -66 | + 38   | -      | +4.7                            | + 7.5      | - |
| 6         |              | 16.2         | 50           | 3            | 298          | 30           | 60           | 33           | -65 | + 39   | -      | +4.8                            | + 7.3      | - |
| 7         |              | 16.2         | 50           | 33           | 299          | 13           | 59           | 49           | -65 | + 40   | -      | +5.0                            | + 7.2      | - |
| 8         |              | 16.2         | 51           | 3            | 299          | 55           | 59           | 7            | -64 | + 42   | -      | +5.1                            | + 7.0      | - |
| 9         |              | 16.1         | 51           | 33           | 300          | 37           | 58           | 25           | -63 | + 43   | -      | +5.2                            | + 6.8      | - |
| 10        |              | 16.1         | 52           | 5            | 301          | 17           | 57           | 45           | -62 | + 44   | -      | +5.3                            | + 6.6      | - |
| 11        |              | 16.1         | 52           | 37           | 301          | 56           | 57           | 6            | -62 | + 45   | -      | +5.4                            | + 6.4      | - |
| 12        |              | 16.0         | 53           | 9            | 302          | 34           | 56           | 27           | -61 | + 46   | -      | +5.5                            | + 6.3      | - |
| 13        |              | 16.0         | 53           | 42           | 303          | 11           | 55           | 50           | -61 | + 48   | -      | +5.5                            | + 6.1      | - |
| 14        |              | 16.0         | 54           | 16           | 303          | 47           | 55           | 14           | -60 | + 49   | -      | +5.6                            | + 5.9      | - |
| 15        |              | 15.9         | 54           | 50           | 304          | 22           | 54           | 38           | -59 | + 49   | -      | +5.7                            | + 5.7      | - |
| 16        |              | 15.9         | 55           | 24           | 304          | 56           | 54           | 4            | -59 | + 50   | -      | +5.8                            | + 5.6      | - |
| 17        |              | 15.8         | 55           | 59           | 305          | 29           | 53           | 31           | -58 | + 51   | -      | +5.9                            | + 5.4      | - |
| 18        |              | 15.8         | 56           | 35           | 306          | 2            | 52           | 58           | -57 | + 52   | -      | +6.0                            | + 5.3      | - |
| 19        |              | 15.8         | 57           | 11           | 306          | 33           | 52           | 27           | -56 | + 53   | -      | +6.0                            | + 5.1      | - |
| +20       | 9            | 15.7         | 57           | 47           | 307          | 3            | 51           | 56           | -55 | + 53   | -      | +6.1                            | + 5.0      | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$    | $\delta S$   | $\delta z$   | $\delta A_E$ | $\delta A_W$ |
|--------------|--------------|--------------|--------------|--------------|
| <sup>°</sup> | <sup>m</sup> | <sup>'</sup> | <sup>'</sup> | <sup>'</sup> |
| + 0          | +0.05        | +0.1         | +0.4         | 0.0          |
| 5            | 0.05         | 0.1          | 0.4          | 0.0          |
| 10           | 0.05         | 0.1          | 0.4          | +0.1         |
| 15           | 0.06         | 0.2          | 0.4          | 0.1          |
| +20          | +0.06        | +0.2         | +0.4         | +0.1         |

|             | No.   | Star             | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|-------|------------------|------|---------------------------|---------------------------|
|             |       |                  |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 82 | E 110 | $\zeta$ Virginis | 3.4  | 13 32.1                   | -0 20                     |
|             | W 49  | $\delta$ Orionis | 2.5  | 5 29.5                    | -0 20                     |

| $\varphi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|---------------------------------|------------|---|
|           | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                      | $\Delta A$ | E |
| + 0       | 9            | 30.8         | 60           | 58           | 270          | 23           | 89           | 37           | -75 | 0      | -      | +0.1                            | + 5.6      | - |
| 1         |              | 30.8         | 60           | 58           | 270          | 57           | 89           | 4            | -75 | + 2    | -      | +0.2                            | + 5.6      | - |
| 2         |              | 30.8         | 61           | 0            | 271          | 30           | 88           | 31           | -75 | + 4    | -      | +0.3                            | + 5.5      | - |
| 3         |              | 30.8         | 61           | 2            | 272          | 3            | 87           | 57           | -75 | + 6    | -      | +0.4                            | + 5.5      | - |
| 4         |              | 30.8         | 61           | 4            | 272          | 36           | 87           | 24           | -75 | + 7    | -      | +0.5                            | + 5.5      | - |
| 5         |              | 30.8         | 61           | 7            | 273          | 9            | 86           | 51           | -75 | + 9    | -      | +0.6                            | + 5.5      | - |
| 6         |              | 30.8         | 61           | 11           | 273          | 43           | 86           | 18           | -74 | + 11   | -      | +0.6                            | + 5.5      | - |
| 7         |              | 30.8         | 61           | 15           | 274          | 15           | 85           | 45           | -74 | + 12   | -      | +0.7                            | + 5.5      | - |
| 8         |              | 30.8         | 61           | 20           | 274          | 48           | 85           | 12           | -74 | + 14   | -      | +0.8                            | + 5.5      | - |
| 9         |              | 30.8         | 61           | 25           | 275          | 21           | 84           | 40           | -74 | + 16   | -      | +0.9                            | + 5.4      | - |
| 10        |              | 30.8         | 61           | 31           | 275          | 53           | 84           | 7            | -73 | + 17   | -      | +1.0                            | + 5.4      | - |
| 11        |              | 30.8         | 61           | 37           | 276          | 26           | 83           | 35           | -73 | + 19   | -      | +1.1                            | + 5.4      | - |
| 12        |              | 30.8         | 61           | 44           | 276          | 58           | 83           | 3            | -73 | + 21   | -      | +1.2                            | + 5.3      | - |
| 13        |              | 30.8         | 61           | 52           | 277          | 30           | 82           | 31           | -72 | + 22   | -      | +1.3                            | + 5.3      | - |
| 14        |              | 30.8         | 62           | 0            | 278          | 1            | 81           | 59           | -72 | + 24   | -      | +1.4                            | + 5.3      | - |
| 15        |              | 30.8         | 62           | 8            | 278          | 33           | 81           | 28           | -72 | + 25   | -      | +1.5                            | + 5.2      | - |
| 16        |              | 30.8         | 62           | 18           | 279          | 4            | 80           | 57           | -71 | + 27   | -      | +1.6                            | + 5.2      | - |
| 17        |              | 30.8         | 62           | 27           | 279          | 35           | 80           | 26           | -71 | + 29   | -      | +1.7                            | + 5.1      | - |
| 18        |              | 30.8         | 62           | 38           | 280          | 6            | 79           | 55           | -70 | + 30   | -      | +1.8                            | + 5.1      | - |
| 19        |              | 30.8         | 62           | 48           | 280          | 36           | 79           | 24           | -70 | + 31   | -      | +1.8                            | + 5.1      | - |
| +20       | 9            | 30.8         | 63           | 0            | 281          | 6            | 78           | 54           | -69 | + 33   | -      | +1.9                            | + 5.0      | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$    | $\delta S$   | $\delta z$   | $\delta A_E$ | $\delta A_W$ |
|--------------|--------------|--------------|--------------|--------------|
| <sup>°</sup> | <sup>m</sup> | <sup>'</sup> | <sup>'</sup> | <sup>'</sup> |
| + 0          | +0.05        | 0.0          | +0.4         | +0.1         |
| 5            | 0.05         | 0.0          | 0.4          | 0.1          |
| 10           | 0.05         | 0.0          | 0.4          | 0.1          |
| 15           | 0.06         | 0.0          | 0.4          | 0.1          |
| +20          | +0.06        | +0.1         | +0.4         | +0.1         |



TABLE II.

|             | No.   | Star               | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|-------|--------------------|------|---------------------------|---------------------------|
|             |       |                    |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 83 | E 110 | $\zeta$ Virginis   | 3.4  | 13 32.1                   | -0 20                     |
|             | W 52  | $\epsilon$ Orionis | 1.8  | 5 33.7                    | -1 14                     |

| $\varphi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | d $A_E$ | d $A_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|---------|---------|---------------------------------|------------|---|
|           | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |         |         | $\Delta z$                      | $\Delta A$ | E |
| +0        | 9            | 32.9         | 60           | 26           | 270          | 23           | 88           | 35           | -75 | +1      | -       | +0.2                            | +5.7       | - |
| 1         |              | 32.9         | 60           | 27           | 270          | 57           | 88           | 1            | -75 | +2      | -       | +0.3                            | +5.7       | - |
| 2         |              | 32.8         | 60           | 29           | 271          | 31           | 87           | 27           | -75 | +4      | -       | +0.4                            | +5.7       | - |
| 3         |              | 32.8         | 60           | 32           | 272          | 5            | 86           | 53           | -75 | +6      | -       | +0.5                            | +5.6       | - |
| 4         |              | 32.8         | 60           | 35           | 272          | 39           | 86           | 19           | -75 | +8      | -       | +0.6                            | +5.6       | - |
| 5         |              | 32.7         | 60           | 38           | 273          | 13           | 85           | 45           | -75 | +9      | -       | +0.7                            | +5.6       | - |
| 6         |              | 32.7         | 60           | 43           | 273          | 46           | 85           | 12           | -74 | +11     | -       | +0.8                            | +5.6       | - |
| 7         |              | 32.7         | 60           | 47           | 274          | 20           | 84           | 38           | -74 | +13     | -       | +0.8                            | +5.6       | - |
| 8         |              | 32.6         | 60           | 53           | 274          | 53           | 84           | 5            | -74 | +15     | -       | +0.9                            | +5.5       | - |
| 9         |              | 32.6         | 60           | 59           | 275          | 26           | 83           | 31           | -74 | +16     | -       | +1.0                            | +5.5       | - |
| 10        |              | 32.5         | 61           | 5            | 275          | 59           | 82           | 58           | -73 | +18     | -       | +1.1                            | +5.5       | - |
| 11        |              | 32.5         | 61           | 12           | 276          | 32           | 82           | 25           | -73 | +20     | -       | +1.2                            | +5.4       | - |
| 12        |              | 32.5         | 61           | 20           | 277          | 4            | 81           | 53           | -73 | +21     | -       | +1.3                            | +5.4       | - |
| 13        |              | 32.4         | 61           | 28           | 277          | 37           | 81           | 20           | -72 | +23     | -       | +1.4                            | +5.4       | - |
| 14        |              | 32.4         | 61           | 37           | 278          | 9            | 80           | 48           | -72 | +24     | -       | +1.5                            | +5.3       | - |
| 15        |              | 32.4         | 61           | 46           | 278          | 40           | 80           | 16           | -71 | +26     | -       | +1.6                            | +5.3       | - |
| 16        |              | 32.3         | 61           | 56           | 279          | 12           | 79           | 44           | -71 | +28     | -       | +1.7                            | +5.2       | - |
| 17        |              | 32.3         | 62           | 6            | 279          | 43           | 79           | 12           | -70 | +29     | -       | +1.8                            | +5.2       | - |
| 18        |              | 32.2         | 62           | 17           | 280          | 14           | 78           | 41           | -70 | +31     | -       | +1.9                            | +5.1       | - |
| 19        |              | 32.2         | 62           | 29           | 280          | 45           | 78           | 10           | -69 | +32     | -       | +2.0                            | +5.1       | - |
| +20       | 9            | 32.2         | 62           | 41           | 281          | 15           | 77           | 39           | -69 | +33     | -       | +2.1                            | +5.0       | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| +0        | +0.05      | 0.0        | +0.4         | +0.1         |
| 5         | 0.05       | 0.0        | 0.4          | 0.1          |
| 10        | 0.05       | 0.0        | 0.4          | 0.1          |
| 15        | 0.06       | 0.0        | 0.4          | 0.1          |
| +20       | +0.06      | +0.1       | +0.4         | +0.1         |

|             | No.   | Star               | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|-------|--------------------|------|---------------------------|---------------------------|
|             |       |                    |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 84 | E 101 | $\alpha$ Virginis  | 4.2  | 12 2.7                    | +9 1                      |
|             | W 70  | $\beta$ Canis Min. | 3.1  | 7 24.4                    | +8 24                     |

| $\varphi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | d $A_E$ | d $A_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|---------|---------|---------------------------------|------------|---|
|           | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |         |         | $\Delta z$                      | $\Delta A$ | E |
| +0        | 9            | 43.8         | 36           | 19           | 254          | 40           | 104          | 15           | -72 | -27     | +       | -2.6                            | +13.2      | - |
| 1         |              | 43.8         | 36           | 5            | 255          | 59           | 102          | 56           | -73 | -24     | +       | -2.3                            | +13.3      | - |
| 2         |              | 43.7         | 35           | 51           | 257          | 20           | 101          | 35           | -73 | -20     | +       | -2.1                            | +13.5      | - |
| 3         |              | 43.7         | 35           | 39           | 258          | 41           | 100          | 13           | -74 | -16     | +       | -1.9                            | +13.7      | - |
| 4         |              | 43.7         | 35           | 29           | 260          | 4            | 98           | 51           | -74 | -13     | +       | -1.6                            | +13.8      | - |
| 5         |              | 43.6         | 35           | 20           | 261          | 27           | 97           | 27           | -74 | -9      | +       | -1.4                            | +14.0      | - |
| 6         |              | 43.6         | 35           | 12           | 262          | 52           | 96           | 3            | -74 | -5      | +       | -1.1                            | +14.1      | - |
| 7         |              | 43.6         | 35           | 6            | 264          | 16           | 94           | 38           | -74 | -1      | +       | -0.9                            | +14.1      | - |
| 8         |              | 43.5         | 35           | 1            | 265          | 41           | 93           | 13           | -74 | +3      | -       | -0.7                            | +14.2      | - |
| 9         |              | 43.5         | 34           | 58           | 267          | 7            | 91           | 47           | -74 | +7      | -       | -0.4                            | +14.3      | - |
| 10        |              | 43.4         | 34           | 56           | 268          | 32           | 90           | 21           | -74 | +11     | -       | -0.2                            | +14.3      | - |
| 11        |              | 43.4         | 34           | 56           | 269          | 58           | 88           | 55           | -74 | +16     | -       | +0.1                            | +14.3      | - |
| 12        |              | 43.4         | 34           | 58           | 271          | 24           | 87           | 30           | -73 | +20     | -       | +0.3                            | +14.3      | - |
| 13        |              | 43.3         | 35           | 0            | 272          | 49           | 86           | 4            | -73 | +23     | -       | +0.6                            | +14.2      | - |
| 14        |              | 43.3         | 35           | 5            | 274          | 14           | 84           | 39           | -73 | +27     | -       | +0.8                            | +14.2      | - |
| 15        |              | 43.2         | 35           | 10           | 275          | 39           | 83           | 13           | -72 | +31     | -       | +1.1                            | +14.1      | - |
| 16        |              | 43.2         | 35           | 18           | 277          | 3            | 81           | 49           | -71 | +35     | -       | +1.3                            | +13.9      | - |
| 17        |              | 43.2         | 35           | 26           | 278          | 26           | 80           | 25           | -71 | +39     | -       | +1.6                            | +13.8      | - |
| 18        |              | 43.1         | 35           | 36           | 279          | 49           | 79           | 2            | -70 | +42     | -       | +1.8                            | +13.7      | - |
| 19        |              | 43.1         | 35           | 48           | 281          | 11           | 77           | 40           | -69 | +46     | -       | +2.1                            | +13.6      | - |
| +20       | 9            | 43.0         | 36           | 1            | 282          | 32           | 76           | 19           | -68 | +49     | -       | +2.3                            | +13.5      | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| +0        | +0.05      | -0.1       | +0.6         | -0.2         |
| 5         | 0.05       | 0.0        | 0.6          | 0.2          |
| 10        | 0.05       | 0.0        | 0.6          | 0.2          |
| 15        | 0.05       | 0.0        | 0.6          | 0.2          |
| +20       | +0.06      | +0.1       | +0.6         | -0.2         |



TABLE II.

|             |   | No. | Star             | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|---|-----|------------------|------|---------------------------|---------------------------|
|             |   |     |                  |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 85 | E | 116 | $\iota$ Virginis | 4.2  | 14 13.4                   | -5 46                     |
|             | W | 51  | $\iota$ Orionis  | 2.9  | 5 33.0                    | -5 56                     |

| $\phi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |            |   |
|--------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|------------------------------|------------|---|
|        | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                   | $\Delta A$ | E |
| + 0    | 9            | 53.2         | 65           | 49           | 276          | 19           | 83           | 29           | -75 | + 4    | -      | +1.1                         | + 4.5      | - |
| 1      |              | 53.2         | 65           | 56           | 276          | 46           | 83           | 2            | -75 | + 6    | -      | +1.2                         | + 4.4      | - |
| 2      |              | 53.2         | 66           | 3            | 277          | 12           | 82           | 36           | -75 | + 7    | -      | +1.3                         | + 4.4      | - |
| 3      |              | 53.2         | 66           | 11           | 277          | 39           | 82           | 10           | -74 | + 9    | -      | +1.4                         | + 4.4      | - |
| 4      |              | 53.2         | 66           | 19           | 278          | 5            | 81           | 43           | -74 | + 10   | -      | +1.4                         | + 4.3      | - |
| 5      |              | 53.1         | 66           | 28           | 278          | 31           | 81           | 17           | -74 | + 12   | -      | +1.5                         | + 4.3      | - |
| 6      |              | 53.1         | 66           | 37           | 278          | 57           | 80           | 52           | -74 | + 13   | -      | +1.6                         | + 4.3      | - |
| 7      |              | 53.1         | 66           | 47           | 279          | 22           | 80           | 26           | -73 | + 15   | -      | +1.6                         | + 4.2      | - |
| 8      |              | 53.1         | 66           | 57           | 279          | 47           | 80           | 1            | -73 | + 16   | -      | +1.7                         | + 4.2      | - |
| 9      |              | 53.1         | 67           | 7            | 280          | 12           | 79           | 36           | -73 | + 18   | -      | +1.8                         | + 4.2      | - |
| 10     |              | 53.1         | 67           | 18           | 280          | 37           | 79           | 11           | -72 | + 19   | -      | +1.9                         | + 4.1      | - |
| 11     |              | 53.1         | 67           | 30           | 281          | 2            | 78           | 46           | -72 | + 20   | -      | +1.9                         | + 4.1      | - |
| 12     |              | 53.1         | 67           | 41           | 281          | 26           | 78           | 22           | -72 | + 22   | -      | +2.0                         | + 4.0      | - |
| 13     |              | 53.1         | 67           | 54           | 281          | 50           | 77           | 58           | -71 | + 23   | -      | +2.1                         | + 4.0      | - |
| 14     |              | 53.1         | 68           | 6            | 282          | 13           | 77           | 34           | -71 | + 25   | -      | +2.1                         | + 3.9      | - |
| 15     |              | 53.1         | 68           | 19           | 282          | 37           | 77           | 11           | -71 | + 26   | -      | +2.2                         | + 3.9      | - |
| 16     |              | 53.1         | 68           | 33           | 283          | 0            | 76           | 48           | -70 | + 27   | -      | +2.3                         | + 3.8      | - |
| 17     |              | 53.1         | 68           | 47           | 283          | 23           | 76           | 25           | -70 | + 29   | -      | +2.3                         | + 3.8      | - |
| 18     |              | 53.0         | 69           | 1            | 283          | 45           | 76           | 3            | -69 | + 30   | -      | +2.4                         | + 3.7      | - |
| 19     |              | 53.0         | 69           | 15           | 284          | 7            | 75           | 40           | -69 | + 31   | -      | +2.5                         | + 3.7      | - |
| +20    | 9            | 53.0         | 69           | 30           | 284          | 29           | 75           | 18           | -68 | + 33   | -      | +2.5                         | + 3.6      | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| 0      | m          | '          | '            | '            |
| + 0    | +0.05      | 0.0        | +0.3         | +0.1         |
| 5      | 0.05       | 0.0        | 0.3          | 0.1          |
| 10     | 0.05       | +0.1       | 0.3          | 0.1          |
| 15     | 0.05       | 0.1        | 0.3          | 0.1          |
| +20    | +0.06      | +0.1       | +0.3         | +0.1         |

DATA REQUIRED FOR OBSERVATION.

|             |   | No. | Star             | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|---|-----|------------------|------|---------------------------|---------------------------|
|             |   |     |                  |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 86 | E | 101 | $\circ$ Virginis | 4.2  | 12 2.7                    | +9 1                      |
|             | W | 73  | $\beta$ Cancri   | 3.8  | 8 13.8                    | +9 20                     |

| $\phi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |            |   |
|--------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|------------------------------|------------|---|
|        | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                   | $\Delta A$ | E |
| + 0    | 10           | 8.0          | 30           | 31           | 252          | 3            | 108          | 38           | -71 | - 42   | +      | -3.2                         | +16.1      | - |
| 1      |              | 8.1          | 30           | 13           | 253          | 41           | 107          | 1            | -72 | - 37   | +      | -2.9                         | +16.4      | - |
| 2      |              | 8.1          | 29           | 56           | 255          | 20           | 105          | 21           | -72 | - 33   | +      | -2.6                         | +16.7      | - |
| 3      |              | 8.1          | 29           | 42           | 257          | 2            | 103          | 40           | -73 | - 28   | +      | -2.3                         | +17.0      | - |
| 4      |              | 8.1          | 29           | 29           | 258          | 45           | 101          | 57           | -73 | - 23   | +      | -2.0                         | +17.3      | - |
| 5      |              | 8.2          | 29           | 18           | 260          | 30           | 100          | 12           | -74 | - 17   | +      | -1.7                         | +17.6      | - |
| 6      |              | 8.2          | 29           | 9            | 262          | 16           | 98           | 26           | -74 | - 12   | +      | -1.4                         | +17.8      | - |
| 7      |              | 8.2          | 29           | 1            | 264          | 3            | 96           | 39           | -74 | - 6    | +      | -1.1                         | +17.9      | - |
| 8      |              | 8.2          | 28           | 55           | 265          | 51           | 94           | 51           | -74 | - 1    | +      | -0.8                         | +18.0      | - |
| 9      |              | 8.3          | 28           | 52           | 267          | 39           | 93           | 3            | -74 | + 5    | -      | -0.5                         | +18.1      | - |
| 10     |              | 8.3          | 28           | 50           | 269          | 28           | 91           | 14           | -74 | + 11   | -      | -0.2                         | +18.2      | - |
| 11     |              | 8.3          | 28           | 50           | 271          | 17           | 89           | 25           | -74 | + 17   | -      | +0.2                         | +18.2      | - |
| 12     |              | 8.3          | 28           | 52           | 273          | 6            | 87           | 36           | -73 | + 23   | -      | +0.5                         | +18.1      | - |
| 13     |              | 8.4          | 28           | 55           | 274          | 54           | 85           | 48           | -73 | + 28   | -      | +0.8                         | +18.0      | - |
| 14     |              | 8.4          | 29           | 1            | 276          | 42           | 84           | 1            | -72 | + 34   | -      | +1.1                         | +17.9      | - |
| 15     |              | 8.4          | 29           | 9            | 278          | 29           | 82           | 13           | -72 | + 39   | -      | +1.4                         | +17.8      | - |
| 16     |              | 8.4          | 29           | 18           | 280          | 16           | 80           | 27           | -71 | + 44   | -      | +1.7                         | +17.6      | - |
| 17     |              | 8.5          | 29           | 29           | 282          | 0            | 78           | 43           | -70 | + 49   | -      | +2.0                         | +17.3      | - |
| 18     |              | 8.5          | 29           | 42           | 283          | 43           | 77           | 0            | -69 | + 54   | -      | +2.3                         | +17.0      | - |
| 19     |              | 8.5          | 29           | 57           | 285          | 25           | 75           | 19           | -68 | + 58   | -      | +2.6                         | +16.8      | - |
| +20    | 10           | 8.5          | 30           | 13           | 287          | 5            | 73           | 39           | -67 | + 62   | -      | +2.9                         | +16.5      | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| 0      | m          | '          | '            | '            |
| + 0    | +0.05      | -0.1       | +0.7         | -0.3         |
| 5      | 0.05       | -0.1       | 0.7          | 0.4          |
| 10     | 0.05       | 0.0        | 0.7          | 0.4          |
| 15     | 0.05       | 0.0        | 0.7          | 0.4          |
| +20    | +0.06      | +0.1       | +0.7         | -0.3         |



TABLE II.

|             | No.   | Star           | Mag. | $\alpha_{1950}$                                     | $\delta_{1950}$                                     |
|-------------|-------|----------------|------|---|---|
|             |       |                |      | <sup>h</sup> <sub>h</sub> <sup>m</sup> <sub>m</sub> | <sup>°</sup> <sub>°</sub> <sup>'</sup> <sub>'</sub> |
| Pair No. 87 | E 100 | $\pi$ Virginis | 4.6  | 11 58.3   | +6 54   |
|             | W 75  | $\delta$ Hydræ | 4.2  | 8 35.0  | +5 53   |

| $\varphi$ | S                         |                           | z                         |                           | $A_E$                     |                           | $A_W$                     |                           | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|-----|--------|--------|---------------------------------|------------|---|
|           | <sup>h</sup> <sub>h</sub> | <sup>m</sup> <sub>m</sub> | <sup>°</sup> <sub>°</sub> | <sup>'</sup> <sub>'</sub> | <sup>°</sup> <sub>°</sub> | <sup>'</sup> <sub>'</sub> | <sup>°</sup> <sub>°</sub> | <sup>'</sup> <sub>'</sub> |     |        |        | $\Delta z$                      | $\Delta A$ | E |
| + 0       | 10                        | 17.1                      | 26                        | 45                        | 254                       | 31                        | 103                       | 7                         | -73 | - 38   | +      | -2.5                            | +19.3      | - |
| 1         |                           | 17.1                      | 26                        | 31                        | 256                       | 28                        | 101                       | 10                        | -73 | - 32   | +      | -2.2                            | +19.6      | - |
| 2         |                           | 17.0                      | 26                        | 20                        | 258                       | 26                        | 99                        | 12                        | -74 | - 26   | +      | -1.8                            | +19.8      | - |
| 3         |                           | 16.9                      | 26                        | 10                        | 260                       | 25                        | 97                        | 13                        | -74 | - 19   | +      | -1.5                            | +20.1      | - |
| 4         |                           | 16.8                      | 26                        | 2                         | 262                       | 27                        | 95                        | 11                        | -75 | - 12   | +      | -1.1                            | +20.3      | - |
| 5         |                           | 16.7                      | 25                        | 57                        | 264                       | 29                        | 93                        | 8                         | -75 | - 5    | +      | -0.7                            | +20.5      | - |
| 6         |                           | 16.7                      | 25                        | 53                        | 266                       | 33                        | 91                        | 5                         | -75 | + 2    | -      | -0.4                            | +20.6      | - |
| 7         |                           | 16.6                      | 25                        | 52                        | 268                       | 36                        | 89                        | 1                         | -75 | + 9    | -      | 0.0                             | +20.6      | - |
| 8         |                           | 16.5                      | 25                        | 53                        | 270                       | 39                        | 86                        | 58                        | -74 | + 16   | -      | +0.3                            | +20.6      | - |
| 9         |                           | 16.4                      | 25                        | 56                        | 272                       | 42                        | 84                        | 54                        | -74 | + 23   | -      | +0.7                            | +20.5      | - |
| 10        |                           | 16.3                      | 26                        | 1                         | 274                       | 45                        | 82                        | 51                        | -73 | + 30   | -      | +1.0                            | +20.4      | - |
| 11        |                           | 16.2                      | 26                        | 8                         | 276                       | 47                        | 80                        | 49                        | -73 | + 37   | -      | +1.4                            | +20.2      | - |
| 12        |                           | 16.1                      | 26                        | 18                        | 278                       | 46                        | 78                        | 49                        | -72 | + 43   | -      | +1.7                            | +19.9      | - |
| 13        |                           | 16.1                      | 26                        | 29                        | 280                       | 45                        | 76                        | 50                        | -71 | + 49   | -      | +2.1                            | +19.6      | - |
| 14        |                           | 16.0                      | 26                        | 42                        | 282                       | 41                        | 74                        | 53                        | -70 | + 55   | -      | +2.4                            | +19.3      | - |
| 15        |                           | 15.9                      | 26                        | 58                        | 284                       | 36                        | 72                        | 58                        | -69 | + 60   | -      | +2.7                            | +18.9      | - |
| 16        |                           | 15.8                      | 27                        | 15                        | 286                       | 28                        | 71                        | 4                         | -68 | + 66   | -      | +3.0                            | +18.5      | - |
| 17        |                           | 15.7                      | 27                        | 34                        | 288                       | 18                        | 69                        | 14                        | -67 | + 70   | -      | +3.3                            | +18.0      | - |
| 18        |                           | 15.6                      | 27                        | 55                        | 290                       | 4                         | 67                        | 27                        | -66 | + 75   | -      | +3.6                            | +17.5      | - |
| 19        |                           | 15.5                      | 28                        | 18                        | 291                       | 47                        | 65                        | 43                        | -65 | + 79   | -      | +3.9                            | +17.0      | - |
| +20       | 10                        | 15.4                      | 28                        | 42                        | 293                       | 28                        | 64                        | 2                         | -64 | + 82   | -      | +4.2                            | +16.5      | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| + 0       | +0.05      | -0.1       | +0.7         | -0.4         |
| 5         | 0.05       | 0.0        | 0.8          | 0.5          |
| 10        | 0.05       | 0.0        | 0.8          | 0.5          |
| 15        | 0.05       | +0.1       | 0.7          | 0.4          |
| +20       | +0.05      | +0.1       | +0.7         | -0.4         |

|             | No.   | Star            | Mag. | $\alpha_{1950}$                                     | $\delta_{1950}$                                     |
|-------------|-------|-----------------|------|---|---|
|             |       |                 |      | <sup>h</sup> <sub>h</sub> <sup>m</sup> <sub>m</sub> | <sup>°</sup> <sub>°</sub> <sup>'</sup> <sub>'</sub> |
| Pair No. 88 | E 113 | $\tau$ Virginis | 4.3  | 13 59.1   | +1 47   |
|             | W 63  | 18 Monocerotis  | 4.7  | 6 45.3  | +2 28   |

| $\varphi$ | S                         |                           | z                         |                           | $A_E$                     |                           | $A_W$                     |                           | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|-----|--------|--------|---------------------------------|------------|---|
|           | <sup>h</sup> <sub>h</sub> | <sup>m</sup> <sub>m</sub> | <sup>°</sup> <sub>°</sub> | <sup>'</sup> <sub>'</sub> | <sup>°</sup> <sub>°</sub> | <sup>'</sup> <sub>'</sub> | <sup>°</sup> <sub>°</sub> | <sup>'</sup> <sub>'</sub> |     |        |        | $\Delta z$                      | $\Delta A$ | E |
| + 0       | 10                        | 22.1                      | 54                        | 53                        | 267                       | 49                        | 93                        | 1                         | -75 | - 2    | +      | -0.5                            | + 7.0      | - |
| 1         |                           | 22.2                      | 54                        | 51                        | 268                       | 31                        | 92                        | 19                        | -75 | - 1    | +      | -0.3                            | + 7.0      | - |
| 2         |                           | 22.2                      | 54                        | 49                        | 269                       | 14                        | 91                        | 37                        | -75 | + 2    | -      | -0.2                            | + 7.1      | - |
| 3         |                           | 22.2                      | 54                        | 48                        | 269                       | 56                        | 90                        | 55                        | -75 | + 3    | -      | -0.1                            | + 7.1      | - |
| 4         |                           | 22.3                      | 54                        | 48                        | 270                       | 38                        | 90                        | 12                        | -75 | + 5    | -      | 0.0                             | + 7.1      | - |
| 5         |                           | 22.3                      | 54                        | 49                        | 271                       | 21                        | 89                        | 30                        | -75 | + 7    | -      | +0.1                            | + 7.1      | - |
| 6         |                           | 22.3                      | 54                        | 50                        | 272                       | 3                         | 88                        | 48                        | -75 | + 9    | -      | +0.3                            | + 7.1      | - |
| 7         |                           | 22.4                      | 54                        | 52                        | 272                       | 45                        | 88                        | 6                         | -74 | + 11   | -      | +0.4                            | + 7.0      | - |
| 8         |                           | 22.4                      | 54                        | 55                        | 273                       | 28                        | 87                        | 24                        | -74 | + 13   | -      | +0.5                            | + 7.0      | - |
| 9         |                           | 22.4                      | 54                        | 58                        | 274                       | 10                        | 86                        | 42                        | -74 | + 15   | -      | +0.7                            | + 7.0      | - |
| 10        |                           | 22.4                      | 55                        | 3                         | 274                       | 52                        | 86                        | 0                         | -74 | + 17   | -      | +0.8                            | + 7.0      | - |
| 11        |                           | 22.5                      | 55                        | 6                         | 275                       | 33                        | 85                        | 18                        | -73 | + 19   | -      | +0.9                            | + 7.0      | - |
| 12        |                           | 22.5                      | 55                        | 13                        | 276                       | 15                        | 84                        | 37                        | -73 | + 21   | -      | +1.0                            | + 6.9      | - |
| 13        |                           | 22.5                      | 55                        | 20                        | 276                       | 56                        | 83                        | 55                        | -73 | + 23   | -      | +1.1                            | + 6.9      | - |
| 14        |                           | 22.6                      | 55                        | 27                        | 277                       | 38                        | 83                        | 15                        | -72 | + 25   | -      | +1.3                            | + 6.9      | - |
| 15        |                           | 22.6                      | 55                        | 35                        | 278                       | 19                        | 82                        | 34                        | -72 | + 27   | -      | +1.4                            | + 6.8      | - |
| 16        |                           | 22.6                      | 55                        | 43                        | 278                       | 59                        | 81                        | 53                        | -71 | + 28   | -      | +1.5                            | + 6.8      | - |
| 17        |                           | 22.7                      | 55                        | 53                        | 279                       | 40                        | 81                        | 13                        | -71 | + 30   | -      | +1.6                            | + 6.7      | - |
| 18        |                           | 22.7                      | 56                        | 3                         | 280                       | 20                        | 80                        | 33                        | -70 | + 32   | -      | +1.7                            | + 6.7      | - |
| 19        |                           | 22.7                      | 56                        | 13                        | 281                       | 0                         | 79                        | 54                        | -70 | + 34   | -      | +1.8                            | + 6.6      | - |
| +20       | 10                        | 22.8                      | 56                        | 25                        | 281                       | 39                        | 79                        | 15                        | -69 | + 35   | -      | +2.0                            | + 6.6      | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| + 0       | +0.05      | 0.0        | +0.4         | -0.1         |
| 5         | 0.05       | 0.0        | 0.4          | 0.1          |
| 10        | 0.05       | 0.0        | 0.4          | 0.1          |
| 15        | 0.05       | 0.0        | 0.4          | 0.1          |
| +20       | +0.05      | +0.1       | +0.4         | -0.1         |



TABLE II.

|             |   | No. | Star               | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|---|-----|--------------------|------|---------------------------|---------------------------|
|             |   |     |                    |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 89 | E | 111 | $\tau$ Bootis      | 4.5  | 13 44.9                   | +17 42                    |
|             | W | 67  | $\lambda$ Geminor. | 3.7  | 7 15.2                    | +16 38                    |

| $\varphi$ | S       | z     | $A_E$  | $A_W$  | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |              |              |
|-----------|---------|-------|--------|--------|-----|--------|--------|---------------------------------|--------------|--------------|
|           |         |       |        |        |     |        |        | $\Delta z$                      | $\Delta A_E$ | $\Delta A_W$ |
| + 0       | 10 30.6 | 51 30 | 247 8  | 111 27 | -69 | - 23 + | -3.8   | + 7.3 -                         |              |              |
| 1         | 30.6    | 51 7  | 247 52 | 110 42 | -70 | - 21 + | -3.7   | + 7.5 -                         |              |              |
| 2         | 30.5    | 50 46 | 248 38 | 109 57 | -70 | - 20 + | -3.5   | + 7.6 -                         |              |              |
| 3         | 30.5    | 50 25 | 249 24 | 109 10 | -71 | - 18 + | -3.4   | + 7.8 -                         |              |              |
| 4         | 30.4    | 50 5  | 250 11 | 108 23 | -71 | - 16 + | -3.3   | + 7.9 -                         |              |              |
| 5         | 30.4    | 49 46 | 250 59 | 107 35 | -71 | - 14 + | -3.1   | + 8.0 -                         |              |              |
| 6         | 30.3    | 49 27 | 251 47 | 106 47 | -71 | - 12 + | -3.0   | + 8.1 -                         |              |              |
| 7         | 30.3    | 49 10 | 252 36 | 105 57 | -71 | - 10 + | -2.9   | + 8.3 -                         |              |              |
| 8         | 30.2    | 48 53 | 253 26 | 105 7  | -72 | - 8 +  | -2.7   | + 8.4 -                         |              |              |
| 9         | 30.2    | 48 37 | 254 17 | 104 17 | -72 | - 6 +  | -2.6   | + 8.5 -                         |              |              |
| 10        | 30.1    | 48 22 | 255 8  | 103 25 | -72 | - 3 +  | -2.4   | + 8.6 -                         |              |              |
| 11        | 30.1    | 48 8  | 256 0  | 102 33 | -72 | - 1 +  | -2.3   | + 8.7 -                         |              |              |
| 12        | 30.0    | 47 54 | 256 53 | 101 40 | -72 | + 1 -  | -2.2   | + 8.8 -                         |              |              |
| 13        | 30.0    | 47 42 | 257 46 | 100 47 | -72 | + 3 -  | -2.0   | + 8.9 -                         |              |              |
| 14        | 29.9    | 47 30 | 258 39 | 99 53  | -72 | + 6 -  | -1.8   | + 9.0 -                         |              |              |
| 15        | 29.9    | 47 20 | 259 33 | 98 58  | -71 | + 8 -  | -1.7   | + 9.1 -                         |              |              |
| 16        | 29.8    | 47 10 | 260 28 | 98 3   | -71 | + 10 - | -1.5   | + 9.1 -                         |              |              |
| 17        | 29.8    | 47 1  | 261 23 | 97 8   | -71 | + 13 - | -1.4   | + 9.2 -                         |              |              |
| 18        | 29.7    | 46 54 | 262 18 | 96 12  | -71 | + 15 - | -1.2   | + 9.3 -                         |              |              |
| 19        | 29.6    | 46 47 | 263 14 | 95 16  | -71 | + 17 - | -1.0   | + 9.3 -                         |              |              |
| +20       | 10 29.6 | 46 41 | 264 10 | 94 19  | -70 | + 20 - | -0.9   | + 9.4 -                         |              |              |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| + 0       | +0.05      | -0.1       | +0.4         | -0.1         |
| 5         | 0.05       | 0.1        | 0.4          | 0.1          |
| 10        | 0.05       | 0.1        | 0.4          | 0.1          |
| 15        | 0.05       | -0.1       | 0.4          | 0.2          |
| +20       | +0.05      | 0.0        | +0.4         | -0.2         |

|             |   | No. | Star                | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|-------------|---|-----|---------------------|------|---------------------------|---------------------------|
|             |   |     |                     |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 90 | E | 114 | $\pi$ Hydræ         | 3.5  | 14 3.5                    | -26 27                    |
|             | W | 66  | $\delta$ Canis Maj. | 2.0  | 7 6.4                     | -26 19                    |

| $\varphi$ | S       | z     | $A_E$  | $A_W$ | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |              |              |
|-----------|---------|-------|--------|-------|-----|--------|--------|---------------------------------|--------------|--------------|
|           |         |       |        |       |     |        |        | $\Delta z$                      | $\Delta A_E$ | $\Delta A_W$ |
| + 0       | 10 35.0 | 57 11 | 302 0  | 58 10 | -64 | + 26 - | +5.3   | + 5.5 -                         |              |              |
| 1         | 35.1    | 57 43 | 302 32 | 57 38 | -63 | + 27 - | +5.4   | + 5.3 -                         |              |              |
| 2         | 35.1    | 58 15 | 303 4  | 57 6  | -63 | + 29 - | +5.4   | + 5.2 -                         |              |              |
| 3         | 35.1    | 58 48 | 303 34 | 56 35 | -62 | + 30 - | +5.5   | + 5.1 -                         |              |              |
| 4         | 35.1    | 59 21 | 304 4  | 56 6  | -62 | + 31 - | +5.6   | + 4.9 -                         |              |              |
| 5         | 35.1    | 59 55 | 304 33 | 55 37 | -61 | + 32 - | +5.7   | + 4.8 -                         |              |              |
| 6         | 35.1    | 60 29 | 305 2  | 55 8  | -61 | + 33 - | +5.7   | + 4.6 -                         |              |              |
| 7         | 35.1    | 61 4  | 305 29 | 54 41 | -61 | + 34 - | +5.8   | + 4.5 -                         |              |              |
| 8         | 35.1    | 61 39 | 305 56 | 54 14 | -60 | + 35 - | +5.9   | + 4.4 -                         |              |              |
| 9         | 35.1    | 62 14 | 306 22 | 53 48 | -60 | + 35 - | +5.9   | + 4.3 -                         |              |              |
| 10        | 35.1    | 62 50 | 306 47 | 53 23 | -59 | + 36 - | +6.0   | + 4.1 -                         |              |              |
| 11        | 35.1    | 63 26 | 307 11 | 52 59 | -59 | + 37 - | +6.0   | + 4.0 -                         |              |              |
| 12        | 35.1    | 64 2  | 307 35 | 52 35 | -58 | + 38 - | +6.1   | + 3.9 -                         |              |              |
| 13        | 35.1    | 64 39 | 307 58 | 52 13 | -58 | + 39 - | +6.1   | + 3.7 -                         |              |              |
| 14        | 35.1    | 65 16 | 308 20 | 51 51 | -57 | + 39 - | +6.2   | + 3.6 -                         |              |              |
| 15        | 35.1    | 65 53 | 308 41 | 51 29 | -56 | + 40 - | +6.2   | + 3.5 -                         |              |              |
| 16        | 35.1    | 66 31 | 309 2  | 51 9  | -56 | + 41 - | +6.3   | + 3.4 -                         |              |              |
| 17        | 35.1    | 67 8  | 309 22 | 50 49 | -55 | + 42 - | +6.3   | + 3.3 -                         |              |              |
| 18        | 35.2    | 67 47 | 309 41 | 50 30 | -55 | + 42 - | +6.4   | + 3.2 -                         |              |              |
| 19        | 35.2    | 68 25 | 309 59 | 50 11 | -54 | + 43 - | +6.4   | + 3.0 -                         |              |              |
| +20       | 10 35.2 | 69 4  | 310 17 | 49 53 | -53 | + 44 - | +6.5   | + 2.9 -                         |              |              |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| + 0       | +0.05      | +0.2       | +0.3         | -0.1         |
| 5         | 0.05       | 0.2        | 0.3          | 0.0          |
| 10        | 0.05       | 0.2        | 0.3          | 0.0          |
| 15        | 0.05       | 0.2        | 0.2          | 0.0          |
| +20       | +0.05      | +0.2       | +0.2         | 0.0          |



TABLE II.

Pair No. 91  
 E 115  $\alpha$  Bootis 0.2  $\alpha_{1950}$  14 13.4  $\delta_{1950}$  +19 27  
 W 65  $\zeta$  Geminor. 3.7-4.1 7 1.1 +20 39

| $\phi$ | S  |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |      |       |   |
|--------|----|------|----|----|-------|----|-------|----|-----|--------|--------|------------------------------|------|-------|---|
|        | h  | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                   | E    | W     |   |
| +0     | 10 | 36.6 | 57 | 5  | 246   | 39 | 114   | 50 | -68 | -      | 20     | +                            | -4.1 | + 5.9 | - |
| 1      |    | 36.7 | 56 | 41 | 247   | 15 | 114   | 15 | -69 | -      | 19     | +                            | -4.0 | + 6.0 | - |
| 2      |    | 36.7 | 56 | 17 | 247   | 51 | 113   | 38 | -69 | -      | 17     | +                            | -3.9 | + 6.2 | - |
| 3      |    | 36.8 | 55 | 54 | 248   | 29 | 113   | 1  | -69 | -      | 16     | +                            | -3.8 | + 6.3 | - |
| 4      |    | 36.8 | 55 | 32 | 249   | 7  | 112   | 23 | -70 | -      | 14     | +                            | -3.7 | + 6.4 | - |
| 5      |    | 36.9 | 55 | 10 | 249   | 45 | 111   | 44 | -70 | -      | 13     | +                            | -3.6 | + 6.5 | - |
| 6      |    | 36.9 | 54 | 49 | 250   | 25 | 111   | 5  | -70 | -      | 11     | +                            | -3.5 | + 6.6 | - |
| 7      |    | 37.0 | 54 | 28 | 251   | 5  | 110   | 25 | -70 | -      | 9      | +                            | -3.4 | + 6.7 | - |
| 8      |    | 37.0 | 54 | 8  | 251   | 46 | 109   | 45 | -70 | -      | 8      | +                            | -3.3 | + 6.8 | - |
| 9      |    | 37.1 | 53 | 49 | 252   | 27 | 109   | 3  | -70 | -      | 6      | +                            | -3.1 | + 7.0 | - |
| 10     |    | 37.1 | 53 | 30 | 253   | 9  | 108   | 21 | -70 | -      | 4      | +                            | -3.0 | + 7.1 | - |
| 11     |    | 37.2 | 53 | 13 | 253   | 52 | 107   | 39 | -70 | -      | 2      | +                            | -2.9 | + 7.2 | - |
| 12     |    | 37.3 | 52 | 56 | 254   | 35 | 106   | 56 | -70 |        | 0      |                              | -2.8 | + 7.3 | - |
| 13     |    | 37.3 | 52 | 39 | 255   | 19 | 106   | 12 | -70 | +      | 2      | -                            | -2.7 | + 7.4 | - |
| 14     |    | 37.4 | 52 | 24 | 256   | 4  | 105   | 28 | -70 | +      | 4      | -                            | -2.5 | + 7.5 | - |
| 15     |    | 37.4 | 52 | 9  | 256   | 49 | 104   | 43 | -70 | +      | 6      | -                            | -2.4 | + 7.6 | - |
| 16     |    | 37.5 | 51 | 55 | 257   | 35 | 103   | 58 | -70 | +      | 8      | -                            | -2.3 | + 7.7 | - |
| 17     |    | 37.5 | 51 | 41 | 258   | 21 | 103   | 12 | -70 | +      | 10     | -                            | -2.1 | + 7.8 | - |
| 18     |    | 37.6 | 51 | 29 | 259   | 8  | 102   | 26 | -70 | +      | 12     | -                            | -2.0 | + 7.8 | - |
| 19     |    | 37.6 | 51 | 17 | 259   | 55 | 101   | 39 | -70 | +      | 14     | -                            | -1.9 | + 7.9 | - |
| +20    | 10 | 37.7 | 51 | 6  | 260   | 43 | 100   | 52 | -69 | +      | 16     | -                            | -1.8 | + 8.0 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| 0      | m          | '          | '            | '            |
| +0     | +0.05      | -0.1       | +0.3         | -0.1         |
| 5      | 0.05       | 0.1        | 0.3          | 0.1          |
| 10     | 0.05       | 0.1        | 0.3          | 0.1          |
| 15     | 0.05       | 0.1        | 0.4          | 0.1          |
| +20    | +0.05      | -0.1       | +0.4         | -0.1         |

Pair No. 92  
 E 119 109 Virginis 3.8  $\alpha_{1950}$  14 43.7  $\delta_{1950}$  +2 6  
 W 63 18 Monocerotis 4.7 6 45.3 +2 28

| $\phi$ | S  |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |      |       |   |
|--------|----|------|----|----|-------|----|-------|----|-----|--------|--------|------------------------------|------|-------|---|
|        | h  | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                   | E    | W     |   |
| +0     | 10 | 44.5 | 60 | 28 | 267   | 35 | 92    | 50 | -75 | -      | 2      | +                            | -0.5 | + 5.7 | - |
| 1      |    | 44.5 | 60 | 25 | 268   | 9  | 92    | 16 | -75 |        | 0      |                              | -0.4 | + 5.7 | - |
| 2      |    | 44.5 | 60 | 23 | 268   | 43 | 91    | 42 | -75 | +      | 2      | -                            | -0.3 | + 5.7 | - |
| 3      |    | 44.5 | 60 | 22 | 269   | 17 | 91    | 8  | -75 | +      | 3      | -                            | -0.2 | + 5.7 | - |
| 4      |    | 44.5 | 60 | 21 | 269   | 51 | 90    | 34 | -75 | +      | 5      | -                            | -0.1 | + 5.7 | - |
| 5      |    | 44.5 | 60 | 21 | 270   | 26 | 90    | 0  | -75 | +      | 7      | -                            | 0.0  | + 5.7 | - |
| 6      |    | 44.6 | 60 | 22 | 271   | 0  | 89    | 26 | -75 | +      | 9      | -                            | +0.1 | + 5.7 | - |
| 7      |    | 44.6 | 60 | 23 | 271   | 34 | 88    | 52 | -74 | +      | 10     | -                            | +0.2 | + 5.7 | - |
| 8      |    | 44.6 | 60 | 25 | 272   | 8  | 88    | 18 | -74 | +      | 12     | -                            | +0.3 | + 5.7 | - |
| 9      |    | 44.6 | 60 | 27 | 272   | 42 | 87    | 44 | -74 | +      | 14     | -                            | +0.4 | + 5.7 | - |
| 10     |    | 44.6 | 60 | 30 | 273   | 16 | 87    | 10 | -74 | +      | 15     | -                            | +0.5 | + 5.7 | - |
| 11     |    | 44.6 | 60 | 33 | 273   | 50 | 86    | 36 | -73 | +      | 17     | -                            | +0.6 | + 5.6 | - |
| 12     |    | 44.7 | 60 | 37 | 274   | 24 | 86    | 2  | -73 | +      | 19     | -                            | +0.7 | + 5.6 | - |
| 13     |    | 44.7 | 60 | 42 | 274   | 57 | 85    | 29 | -73 | +      | 21     | -                            | +0.8 | + 5.6 | - |
| 14     |    | 44.7 | 60 | 47 | 275   | 31 | 84    | 55 | -72 | +      | 22     | -                            | +0.9 | + 5.6 | - |
| 15     |    | 44.7 | 60 | 53 | 276   | 4  | 84    | 22 | -72 | +      | 24     | -                            | +1.0 | + 5.6 | - |
| 16     |    | 44.7 | 61 | 0  | 276   | 37 | 83    | 49 | -72 | +      | 25     | -                            | +1.1 | + 5.5 | - |
| 17     |    | 44.7 | 61 | 7  | 277   | 11 | 83    | 16 | -71 | +      | 27     | -                            | +1.2 | + 5.5 | - |
| 18     |    | 44.8 | 61 | 14 | 277   | 43 | 82    | 43 | -71 | +      | 29     | -                            | +1.3 | + 5.5 | - |
| 19     |    | 44.8 | 61 | 22 | 278   | 16 | 82    | 11 | -70 | +      | 30     | -                            | +1.4 | + 5.4 | - |
| +20    | 10 | 44.8 | 61 | 31 | 278   | 48 | 81    | 39 | -70 | +      | 32     | -                            | +1.5 | + 5.4 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| 0      | m          | '          | '            | '            |
| +0     | +0.05      | 0.0        | +0.3         | -0.1         |
| 5      | 0.05       | 0.0        | 0.3          | 0.1          |
| 10     | 0.05       | 0.0        | 0.3          | 0.1          |
| 15     | 0.05       | 0.0        | 0.3          | 0.1          |
| +20    | +0.05      | +0.1       | +0.3         | -0.1         |



TABLE II.

Pair No. 93  
 E 107  $\epsilon$  Virginis 3.0  $\alpha_{1950}$   $\delta_{1950}$   
 W 79  $\alpha$  Cancri 4.3 12 59.7 +11 14  
 8 55.8 +12 3

| $\varphi$ | S  |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|----|------|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------------|---|
|           | h  | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | $\Delta A$ | E |
| +0        | 10 | 57.1 | 33 | 1  | 249   | 5  | 112   | 32 | -69 | -44    | +      | -3.7                            | +14.3      | - |
| 1         |    | 57.2 | 32 | 39 | 250   | 32 | 111   | 6  | -70 | -41    | +      | -3.5                            | +14.6      | - |
| 2         |    | 57.3 | 32 | 19 | 252   | 1  | 109   | 37 | -71 | -37    | +      | -3.2                            | +14.9      | - |
| 3         |    | 57.3 | 32 | 1  | 253   | 31 | 108   | 7  | -71 | -33    | +      | -3.0                            | +15.3      | - |
| 4         |    | 57.4 | 31 | 44 | 255   | 4  | 106   | 34 | -72 | -29    | +      | -2.7                            | +15.6      | - |
| 5         |    | 57.4 | 31 | 28 | 256   | 38 | 105   | 0  | -72 | -24    | +      | -2.5                            | +15.9      | - |
| 6         |    | 57.5 | 31 | 14 | 258   | 14 | 103   | 24 | -73 | -20    | +      | -2.2                            | +16.1      | - |
| 7         |    | 57.5 | 31 | 2  | 259   | 52 | 101   | 47 | -73 | -15    | +      | -1.9                            | +16.3      | - |
| 8         |    | 57.6 | 30 | 52 | 261   | 30 | 100   | 9  | -73 | -10    | +      | -1.6                            | +16.5      | - |
| 9         |    | 57.7 | 30 | 43 | 263   | 10 | 98    | 29 | -73 | -5     | +      | -1.3                            | +16.7      | - |
| 10        |    | 57.7 | 30 | 36 | 264   | 50 | 96    | 49 | -73 | 0      |        | -1.0                            | +16.9      | - |
| 11        |    | 57.8 | 30 | 30 | 266   | 32 | 95    | 7  | -73 | +5     | -      | -0.7                            | +17.0      | - |
| 12        |    | 57.8 | 30 | 27 | 268   | 14 | 93    | 26 | -73 | +10    | -      | -0.5                            | +17.0      | - |
| 13        |    | 57.9 | 30 | 25 | 269   | 56 | 91    | 44 | -73 | +15    | -      | -0.2                            | +17.0      | - |
| 14        |    | 58.0 | 30 | 25 | 271   | 38 | 90    | 2  | -73 | +20    | -      | +0.1                            | +17.1      | - |
| 15        |    | 58.0 | 30 | 26 | 273   | 21 | 88    | 20 | -72 | +25    | -      | +0.4                            | +17.1      | - |
| 16        |    | 58.1 | 30 | 30 | 275   | 3  | 86    | 39 | -72 | +30    | -      | +0.7                            | +17.0      | - |
| 17        |    | 58.1 | 30 | 35 | 276   | 44 | 84    | 58 | -71 | +35    | -      | +1.0                            | +16.8      | - |
| 18        |    | 58.2 | 30 | 42 | 278   | 25 | 83    | 18 | -71 | +40    | -      | +1.3                            | +16.7      | - |
| 19        |    | 58.3 | 30 | 51 | 280   | 5  | 81    | 38 | -70 | +45    | -      | +1.6                            | +16.6      | - |
| +20       | 10 | 58.3 | 31 | 1  | 281   | 44 | 80    | 0  | -69 | +49    | -      | +1.9                            | +16.4      | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| +0        | +0.05      | -0.1       | +0.6         | -0.4         |
| 5         | 0.05       | -0.1       | 0.6          | 0.4          |
| 10        | 0.05       | 0.0        | 0.7          | 0.5          |
| 15        | 0.05       | 0.0        | 0.7          | 0.5          |
| +20       | +0.05      | +0.1       | +0.6         | -0.5         |

DATA REQUIRED FOR OBSERVATION.

Pair No. 94  
 E 122  $\delta$  Bootis 3.5  $\alpha_{1950}$   $\delta_{1950}$   
 W 64  $\theta$  Geminor. 3.6 15 13.5 +33 30  
 6 49.5 +34 1

| $\varphi$ | S  |     | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|----|-----|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------------|---|
|           | h  | m   | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | $\Delta A$ | E |
| +0        | 11 | 1.1 | 68 | 20 | 233   | 34 | 127   | 1  | -60 | -18    | +      | -6.0                            | +3.2       | - |
| 1         |    | 1.2 | 67 | 44 | 233   | 53 | 126   | 42 | -60 | -18    | +      | -5.9                            | +3.3       | - |
| 2         |    | 1.2 | 67 | 8  | 234   | 14 | 126   | 22 | -61 | -17    | +      | -5.9                            | +3.4       | - |
| 3         |    | 1.2 | 66 | 33 | 234   | 34 | 126   | 1  | -61 | -16    | +      | -5.8                            | +3.5       | - |
| 4         |    | 1.2 | 65 | 58 | 234   | 56 | 125   | 39 | -61 | -15    | +      | -5.8                            | +3.6       | - |
| 5         |    | 1.2 | 65 | 24 | 235   | 18 | 125   | 17 | -61 | -14    | +      | -5.7                            | +3.8       | - |
| 6         |    | 1.3 | 64 | 49 | 235   | 41 | 124   | 55 | -61 | -13    | +      | -5.7                            | +3.9       | - |
| 7         |    | 1.3 | 64 | 15 | 236   | 5  | 124   | 31 | -62 | -12    | +      | -5.6                            | +4.0       | - |
| 8         |    | 1.3 | 63 | 42 | 236   | 29 | 124   | 7  | -62 | -11    | +      | -5.6                            | +4.1       | - |
| 9         |    | 1.3 | 63 | 9  | 236   | 54 | 123   | 42 | -62 | -10    | +      | -5.5                            | +4.2       | - |
| 10        |    | 1.3 | 62 | 36 | 237   | 20 | 123   | 16 | -62 | -8     | +      | -5.4                            | +4.4       | - |
| 11        |    | 1.4 | 62 | 3  | 237   | 46 | 122   | 50 | -62 | -7     | +      | -5.4                            | +4.5       | - |
| 12        |    | 1.4 | 61 | 31 | 238   | 14 | 122   | 23 | -62 | -6     | +      | -5.3                            | +4.6       | - |
| 13        |    | 1.4 | 61 | 0  | 238   | 42 | 121   | 55 | -62 | -5     | +      | -5.2                            | +4.7       | - |
| 14        |    | 1.4 | 60 | 28 | 239   | 10 | 121   | 26 | -62 | -4     | +      | -5.2                            | +4.9       | - |
| 15        |    | 1.5 | 59 | 58 | 239   | 40 | 120   | 57 | -62 | -2     | +      | -5.1                            | +5.0       | - |
| 16        |    | 1.5 | 59 | 27 | 240   | 10 | 120   | 27 | -62 | -1     | +      | -5.0                            | +5.1       | - |
| 17        |    | 1.5 | 58 | 57 | 240   | 41 | 119   | 56 | -62 | 0      |        | -4.9                            | +5.2       | - |
| 18        |    | 1.5 | 58 | 28 | 241   | 13 | 119   | 24 | -62 | +2     | -      | -4.9                            | +5.4       | - |
| 19        |    | 1.5 | 57 | 59 | 241   | 46 | 118   | 51 | -62 | +3     | -      | -4.8                            | +5.5       | - |
| +20       | 11 | 1.6 | 57 | 31 | 242   | 19 | 118   | 18 | -62 | +4     | -      | -4.7                            | +5.7       | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| +0        | +0.05      | -0.2       | +0.2         | 0.0          |
| 5         | 0.05       | 0.2        | 0.2          | 0.0          |
| 10        | 0.05       | 0.2        | 0.2          | -0.1         |
| 15        | 0.05       | 0.2        | 0.3          | 0.1          |
| +20       | +0.05      | -0.2       | +0.3         | -0.1         |



TABLE II.

|             |       |                   |      |                           |                           |
|-------------|-------|-------------------|------|---------------------------|---------------------------|
|             | No.   | Star              | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|             |       |                   |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 95 | E 127 | $\beta$ Serpentis | 3.7  | 15 43.9                   | +15 35                    |
|             | W 61  | $\gamma$ Geminor. | 1.9  | 6 34.8                    | +16 27                    |

| $\varphi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |       |   |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|---------------------------------|------------|-------|---|
|           | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                      | $\Delta A$ | E     | W |
| + 0       | 11           | 9.2          | 70           | 6            | 253          | 25           | 107          | 31           | -72 | -      | 8      | +                               | -2.9       | + 3.5 | - |
| 1         |              | 9.2          | 69           | 48           | 253          | 46           | 107          | 10           | -72 | -      | 7      | +                               | -2.9       | + 3.5 | - |
| 2         |              | 9.2          | 69           | 31           | 254          | 7            | 106          | 49           | -72 | -      | 6      | +                               | -2.8       | + 3.6 | - |
| 3         |              | 9.3          | 69           | 15           | 254          | 29           | 106          | 27           | -72 | -      | 4      | +                               | -2.8       | + 3.7 | - |
| 4         |              | 9.3          | 68           | 58           | 254          | 51           | 106          | 5            | -72 | -      | 3      | +                               | -2.7       | + 3.7 | - |
| 5         |              | 9.3          | 68           | 42           | 255          | 13           | 105          | 43           | -72 | -      | 1      | +                               | -2.6       | + 3.8 | - |
| 6         |              | 9.4          | 68           | 27           | 255          | 36           | 105          | 20           | -72 |        | 0      |                                 | -2.6       | + 3.8 | - |
| 7         |              | 9.4          | 68           | 12           | 255          | 59           | 104          | 57           | -72 | +      | 1      | -                               | -2.5       | + 3.9 | - |
| 8         |              | 9.4          | 67           | 57           | 256          | 22           | 104          | 34           | -72 | +      | 3      | -                               | -2.4       | + 3.9 | - |
| 9         |              | 9.5          | 67           | 42           | 256          | 46           | 104          | 10           | -72 | +      | 4      | -                               | -2.4       | + 4.0 | - |
| 10        |              | 9.5          | 67           | 28           | 257          | 10           | 103          | 46           | -72 | +      | 6      | -                               | -2.3       | + 4.1 | - |
| 11        |              | 9.5          | 67           | 15           | 257          | 35           | 103          | 22           | -72 | +      | 7      | -                               | -2.2       | + 4.1 | - |
| 12        |              | 9.6          | 67           | 1            | 258          | 0            | 102          | 57           | -72 | +      | 9      | -                               | -2.2       | + 4.2 | - |
| 13        |              | 9.6          | 66           | 49           | 258          | 25           | 102          | 33           | -71 | +      | 10     | -                               | -2.1       | + 4.2 | - |
| 14        |              | 9.6          | 66           | 36           | 258          | 50           | 102          | 7            | -71 | +      | 12     | -                               | -2.0       | + 4.3 | - |
| 15        |              | 9.7          | 66           | 24           | 259          | 16           | 101          | 42           | -71 | +      | 13     | -                               | -2.0       | + 4.3 | - |
| 16        |              | 9.7          | 66           | 13           | 259          | 42           | 101          | 16           | -71 | +      | 15     | -                               | -1.9       | + 4.4 | - |
| 17        |              | 9.7          | 66           | 2            | 260          | 8            | 100          | 50           | -71 | +      | 16     | -                               | -1.8       | + 4.4 | - |
| 18        |              | 9.8          | 65           | 51           | 260          | 35           | 100          | 24           | -70 | +      | 18     | -                               | -1.7       | + 4.4 | - |
| 19        |              | 9.8          | 65           | 41           | 261          | 1            | 99           | 58           | -70 | +      | 19     | -                               | -1.6       | + 4.5 | - |
| +20       | 11           | 9.8          | 65           | 32           | 261          | 28           | 99           | 31           | -70 | +      | 21     | -                               | -1.6       | + 4.5 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| + 0       | +0.05      | -0.1       | +0.2         | -0.1         |
| 5         | 0.05       | 0.1        | 0.2          | 0.1          |
| 10        | 0.05       | 0.1        | 0.2          | 0.1          |
| 15        | 0.05       | 0.1        | 0.2          | 0.1          |
| +20       | +0.05      | -0.1       | +0.2         | -0.1         |

DATA REQUIRED FOR OBSERVATION.

|             |       |                 |      |                           |                           |
|-------------|-------|-----------------|------|---------------------------|---------------------------|
|             | No.   | Star            | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|             |       |                 |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 96 | E 112 | $\eta$ Bootis   | 2.8  | 13 52.3                   | +18 39                    |
|             | W 76  | $\delta$ Caneri | 4.2  | 8 41.8                    | +18 20                    |

| $\varphi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |       |   |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|---------------------------------|------------|-------|---|
|           | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                      | $\Delta A$ | E     | W |
| + 0       | 11           | 17.3         | 42           | 54           | 241          | 59           | 117          | 31           | -66 | -      | 39     | +                               | -4.7       | + 9.5 | - |
| 1         |              | 17.3         | 42           | 27           | 242          | 57           | 116          | 33           | -67 | -      | 37     | +                               | -4.5       | + 9.8 | - |
| 2         |              | 17.3         | 42           | 0            | 243          | 56           | 115          | 34           | -67 | -      | 35     | +                               | -4.4       | +10.0 | - |
| 3         |              | 17.3         | 41           | 34           | 244          | 57           | 114          | 33           | -68 | -      | 33     | +                               | -4.2       | +10.2 | - |
| 4         |              | 17.3         | 41           | 10           | 245          | 59           | 113          | 31           | -68 | -      | 30     | +                               | -4.0       | +10.5 | - |
| 5         |              | 17.2         | 40           | 46           | 247          | 3            | 112          | 28           | -69 | -      | 28     | +                               | -3.9       | +10.7 | - |
| 6         |              | 17.2         | 40           | 24           | 248          | 8            | 111          | 23           | -69 | -      | 26     | +                               | -3.7       | +10.9 | - |
| 7         |              | 17.2         | 40           | 2            | 249          | 14           | 110          | 17           | -70 | -      | 23     | +                               | -3.5       | +11.1 | - |
| 8         |              | 17.2         | 39           | 42           | 250          | 21           | 109          | 9            | -70 | -      | 20     | +                               | -3.3       | +11.3 | - |
| 9         |              | 17.2         | 39           | 22           | 251          | 30           | 108          | 0            | -70 | -      | 17     | +                               | -3.1       | +11.5 | - |
| 10        |              | 17.2         | 39           | 4            | 252          | 40           | 106          | 50           | -71 | -      | 14     | +                               | -2.9       | +11.8 | - |
| 11        |              | 17.1         | 38           | 47           | 253          | 51           | 105          | 39           | -71 | -      | 11     | +                               | -2.7       | +12.0 | - |
| 12        |              | 17.1         | 38           | 31           | 255          | 3            | 104          | 26           | -71 | -      | 8      | +                               | -2.5       | +12.1 | - |
| 13        |              | 17.1         | 38           | 16           | 256          | 17           | 103          | 13           | -71 | -      | 5      | +                               | -2.3       | +12.3 | - |
| 14        |              | 17.1         | 38           | 3            | 257          | 31           | 101          | 59           | -71 | -      | 2      | +                               | -2.1       | +12.5 | - |
| 15        |              | 17.1         | 37           | 51           | 258          | 46           | 100          | 43           | -71 | +      | 1      | -                               | -1.9       | +12.6 | - |
| 16        |              | 17.1         | 37           | 40           | 260          | 3            | 99           | 27           | -71 | +      | 5      | -                               | -1.7       | +12.8 | - |
| 17        |              | 17.0         | 37           | 31           | 261          | 19           | 98           | 10           | -71 | +      | 8      | -                               | -1.5       | +12.9 | - |
| 18        |              | 17.0         | 37           | 22           | 262          | 37           | 96           | 52           | -71 | +      | 11     | -                               | -1.2       | +13.0 | - |
| 19        |              | 17.0         | 37           | 16           | 263          | 55           | 95           | 34           | -70 | +      | 15     | -                               | -1.0       | +13.0 | - |
| +20       | 11           | 17.0         | 37           | 10           | 265          | 14           | 94           | 15           | -70 | +      | 18     | -                               | -0.8       | +13.2 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| + 0       | +0.05      | -0.2       | +0.4         | -0.3         |
| 5         | 0.05       | 0.1        | 0.4          | 0.3          |
| 10        | 0.05       | 0.1        | 0.5          | 0.3          |
| 15        | 0.05       | 0.1        | 0.5          | 0.4          |
| +20       | +0.05      | 0.0        | +0.5         | -0.4         |



TABLE II.

| Pair No. | E | No. | Star             | Mag. | $\alpha_{1950}$ |      | $\delta_{1950}$ |
|----------|---|-----|------------------|------|-----------------|------|-----------------|
|          |   |     |                  |      | h               | m    | '               |
| 97       | E | 121 | $\psi$ Bootis    | 4.7  | 15              | 23   | +27 9           |
|          | W | 72  | $\beta$ Geminor. | 1.2  | 7               | 42.3 | +28 9           |

| $\varphi$ | S       | z     | $A_E$  | $A_W$  | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|---------|-------|--------|--------|-----|--------|--------|---------------------------------|------------|---|
|           |         |       |        |        |     |        |        | $\Delta z$                      | $\Delta A$ |   |
|           | h m     | ° '   | ° '    | ° '    | '   | '      | '      | E                               | W          |   |
| +0        | 11 21.5 | 60 0  | 238 13 | 123 1  | -63 | -      | 24 +   | -5.4                            | + 4.9      | - |
| 1         | 21.6    | 59 28 | 238 43 | 122 31 | -64 | -      | 23 +   | -5.3                            | + 5.0      | - |
| 2         | 21.6    | 58 56 | 239 13 | 122 1  | -64 | -      | 22 +   | -5.2                            | + 5.1      | - |
| 3         | 21.7    | 58 25 | 239 44 | 121 29 | -64 | -      | 20 +   | -5.1                            | + 5.3      | - |
| 4         | 21.7    | 57 55 | 240 17 | 120 57 | -65 | -      | 19 +   | -5.1                            | + 5.4      | - |
| 5         | 21.8    | 57 25 | 240 50 | 120 25 | -65 | -      | 18 +   | -5.0                            | + 5.6      | - |
| 6         | 21.8    | 56 55 | 241 23 | 119 51 | -65 | -      | 17 +   | -4.9                            | + 5.7      | - |
| 7         | 21.8    | 56 26 | 241 58 | 119 16 | -65 | -      | 15 +   | -4.8                            | + 5.8      | - |
| 8         | 21.9    | 55 58 | 242 33 | 118 41 | -66 | -      | 14 +   | -4.7                            | + 6.0      | - |
| 9         | 21.9    | 55 30 | 243 10 | 118 5  | -66 | -      | 12 +   | -4.6                            | + 6.1      | - |
| 10        | 22.0    | 55 2  | 243 47 | 117 28 | -66 | -      | 11 +   | -4.5                            | + 6.3      | - |
| 11        | 22.0    | 54 35 | 244 25 | 116 51 | -66 | -      | 9 +    | -4.4                            | + 6.4      | - |
| 12        | 22.1    | 54 9  | 245 4  | 116 12 | -66 | -      | 8 +    | -4.3                            | + 6.5      | - |
| 13        | 22.1    | 53 44 | 245 43 | 115 33 | -66 | -      | 6 +    | -4.2                            | + 6.7      | - |
| 14        | 22.2    | 53 19 | 246 24 | 114 52 | -66 | -      | 5 +    | -4.1                            | + 6.8      | - |
| 15        | 22.2    | 52 54 | 247 5  | 114 11 | -66 | -      | 3 +    | -4.0                            | + 7.0      | - |
| 16        | 22.3    | 52 31 | 247 47 | 113 30 | -66 | -      | 1 +    | -3.9                            | + 7.1      | - |
| 17        | 22.3    | 52 8  | 248 30 | 112 47 | -66 | +      | 1 -    | -3.8                            | + 7.2      | - |
| 18        | 22.3    | 51 45 | 249 14 | 112 4  | -66 | +      | 2 -    | -3.7                            | + 7.4      | - |
| 19        | 22.4    | 51 24 | 249 59 | 111 19 | -66 | +      | 4 -    | -3.5                            | + 7.5      | - |
| +20       | 11 22.4 | 51 3  | 250 44 | 110 34 | -66 | +      | 6 -    | -3.4                            | + 7.7      | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| °         | m          | '          | '            | '            |
| +0        | +0.05      | -0.2       | +0.2         | -0.1         |
| 5         | 0.05       | 0.2        | 0.3          | 0.1          |
| 10        | 0.05       | 0.2        | 0.3          | 0.2          |
| 15        | 0.05       | 0.1        | 0.3          | 0.2          |
| +20       | +0.05      | -0.1       | +0.3         | -0.2         |

| Pair No. | E | No. | Star               | Mag. | $\alpha_{1950}$ |      | $\delta_{1950}$ |
|----------|---|-----|--------------------|------|-----------------|------|-----------------|
|          |   |     |                    |      | h               | m    | '               |
| 98       | E | 127 | $\beta$ Serpentis  | 3.7  | 15              | 43.9 | +15 35          |
|          | W | 67  | $\lambda$ Geminor. | 3.7  | 7               | 15.2 | +16 38          |

| $\varphi$ | S       | z     | $A_E$  | $A_W$  | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|---------|-------|--------|--------|-----|--------|--------|---------------------------------|------------|---|
|           |         |       |        |        |     |        |        | $\Delta z$                      | $\Delta A$ |   |
|           | h m     | ° '   | ° '    | ° '    | '   | '      | '      | E                               | W          |   |
| +0        | 11 29.3 | 65 17 | 252 49 | 108 22 | -71 | -      | 11 +   | -3.1                            | + 4.4      | - |
| 1         | 29.3    | 64 59 | 253 15 | 107 56 | -72 | -      | 9 +    | -3.0                            | + 4.5      | - |
| 2         | 29.3    | 64 42 | 253 42 | 107 29 | -72 | -      | 8 +    | -2.9                            | + 4.5      | - |
| 3         | 29.4    | 64 24 | 254 10 | 107 1  | -72 | -      | 6 +    | -2.8                            | + 4.6      | - |
| 4         | 29.4    | 64 8  | 254 37 | 106 34 | -72 | -      | 5 +    | -2.8                            | + 4.7      | - |
| 5         | 29.5    | 63 51 | 255 6  | 106 6  | -72 | -      | 3 +    | -2.7                            | + 4.7      | - |
| 6         | 29.5    | 63 36 | 255 34 | 105 37 | -72 | -      | 2 +    | -2.6                            | + 4.8      | - |
| 7         | 29.5    | 63 20 | 256 3  | 105 8  | -72 | 0      |        | -2.5                            | + 4.9      | - |
| 8         | 29.6    | 63 5  | 256 33 | 104 39 | -72 | +      | 1 -    | -2.4                            | + 4.9      | - |
| 9         | 29.6    | 62 51 | 257 3  | 104 9  | -72 | +      | 3 -    | -2.3                            | + 5.0      | - |
| 10        | 29.7    | 62 37 | 257 33 | 103 39 | -72 | +      | 4 -    | -2.3                            | + 5.1      | - |
| 11        | 29.7    | 62 24 | 258 3  | 103 9  | -72 | +      | 6 -    | -2.2                            | + 5.1      | - |
| 12        | 29.8    | 62 11 | 258 34 | 102 38 | -72 | +      | 7 -    | -2.1                            | + 5.2      | - |
| 13        | 29.8    | 61 59 | 259 5  | 102 7  | -72 | +      | 9 -    | -2.0                            | + 5.2      | - |
| 14        | 29.8    | 61 47 | 259 37 | 101 36 | -71 | +      | 11 -   | -1.9                            | + 5.3      | - |
| 15        | 29.9    | 61 36 | 260 9  | 101 4  | -71 | +      | 12 -   | -1.8                            | + 5.3      | - |
| 16        | 29.9    | 61 26 | 260 41 | 100 32 | -71 | +      | 14 -   | -1.7                            | + 5.4      | - |
| 17        | 30.0    | 61 15 | 261 14 | 100 0  | -71 | +      | 16 -   | -1.6                            | + 5.4      | - |
| 18        | 30.0    | 61 6  | 261 46 | 99 28  | -70 | +      | 17 -   | -1.5                            | + 5.5      | - |
| 19        | 30.1    | 60 57 | 262 20 | 98 55  | -70 | +      | 19 -   | -1.4                            | + 5.5      | - |
| +20       | 11 30.1 | 60 49 | 262 53 | 98 23  | -70 | +      | 20 -   | -1.4                            | + 5.6      | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| °         | m          | '          | '            | '            |
| +0        | +0.05      | -0.1       | +0.2         | -0.1         |
| 5         | 0.05       | 0.1        | 0.2          | 0.1          |
| 10        | 0.05       | 0.1        | 0.2          | 0.1          |
| 15        | 0.05       | -0.1       | 0.2          | 0.1          |
| +20       | +0.05      | 0.0        | +0.2         | -0.1         |



TABLE II.

Pair No. 99  
 E 124  $\beta$  Coron. Bor. 3.7  $\alpha_{1950}$   $\delta_{1950}$   
 W 72  $\beta$  Geminor. 1.2 15 25.8 +29 17  
 7 42.3 +28 9

| $\varphi$ | S  |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |       |   |
|-----------|----|------|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------------|-------|---|
|           | h  | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | $\Delta A$ | E     | W |
| + 0       | 11 | 34.8 | 62 | 47 | 236   | 38 | 122   | 2  | -63 | -      | 21     | +                               | -5.4       | + 4.3 | - |
| 1         |    | 34.7 | 62 | 15 | 237   | 5  | 121   | 36 | -63 | -      | 20     | +                               | -5.3       | + 4.5 | - |
| 2         |    | 34.7 | 61 | 43 | 237   | 32 | 121   | 8  | -64 | -      | 19     | +                               | -5.3       | + 4.6 | - |
| 3         |    | 34.7 | 61 | 11 | 237   | 59 | 120   | 41 | -64 | -      | 18     | +                               | -5.2       | + 4.7 | - |
| 4         |    | 34.6 | 60 | 40 | 238   | 28 | 120   | 12 | -64 | -      | 17     | +                               | -5.1       | + 4.8 | - |
| 5         |    | 34.6 | 60 | 10 | 238   | 57 | 119   | 43 | -64 | -      | 16     | +                               | -5.1       | + 5.0 | - |
| 6         |    | 34.5 | 59 | 40 | 239   | 27 | 119   | 13 | -65 | -      | 14     | +                               | -5.0       | + 5.1 | - |
| 7         |    | 34.5 | 59 | 10 | 239   | 58 | 118   | 42 | -65 | -      | 13     | +                               | -4.9       | + 5.2 | - |
| 8         |    | 34.4 | 58 | 41 | 240   | 29 | 118   | 10 | -65 | -      | 12     | +                               | -4.8       | + 5.3 | - |
| 9         |    | 34.4 | 58 | 12 | 241   | 2  | 117   | 38 | -65 | -      | 11     | +                               | -4.7       | + 5.5 | - |
| 10        |    | 34.3 | 57 | 44 | 241   | 35 | 117   | 4  | -65 | -      | 9      | +                               | -4.7       | + 5.6 | - |
| 11        |    | 34.3 | 57 | 16 | 242   | 9  | 116   | 30 | -65 | -      | 8      | +                               | -4.6       | + 5.7 | - |
| 12        |    | 34.2 | 56 | 49 | 242   | 43 | 115   | 55 | -66 | -      | 6      | +                               | -4.5       | + 5.9 | - |
| 13        |    | 34.2 | 56 | 22 | 243   | 18 | 115   | 20 | -66 | -      | 5      | +                               | -4.4       | + 6.0 | - |
| 14        |    | 34.1 | 55 | 56 | 243   | 54 | 114   | 43 | -66 | -      | 3      | +                               | -4.3       | + 6.1 | - |
| 15        |    | 34.1 | 55 | 31 | 244   | 31 | 114   | 6  | -66 | -      | 2      | +                               | -4.2       | + 6.3 | - |
| 16        |    | 34.0 | 55 | 6  | 245   | 9  | 113   | 28 | -66 | -      | 0      |                                 | -4.1       | + 6.4 | - |
| 17        |    | 34.0 | 54 | 42 | 245   | 47 | 112   | 50 | -66 | +      | 1      | -                               | -4.0       | + 6.5 | - |
| 18        |    | 33.9 | 54 | 18 | 246   | 26 | 112   | 10 | -66 | +      | 3      | -                               | -3.9       | + 6.7 | - |
| 19        |    | 33.9 | 53 | 55 | 247   | 6  | 111   | 30 | -66 | +      | 5      | -                               | -3.8       | + 6.8 | - |
| +20       | 11 | 33.8 | 53 | 33 | 247   | 47 | 110   | 48 | -66 | +      | 6      | -                               | -3.7       | + 6.9 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| + 0       | +0.05      | -0.2       | +0.2         | -0.1         |
| 5         | 0.05       | 0.2        | 0.2          | 0.1          |
| 10        | 0.05       | 0.2        | 0.2          | 0.2          |
| 15        | 0.05       | 0.1        | 0.3          | 0.2          |
| +20       | +0.05      | -0.1       | +0.3         | -0.2         |

DATA REQUIRED FOR OBSERVATION.

Pair No. 100  
 E 130  $\epsilon$  Serpentis 3.8  $\alpha_{1950}$   $\delta_{1950}$   
 W 71  $\alpha$  Canis Min. 0.5 15 48.3 +4 38  
 7 36.7 +5 21

| $\varphi$ | S  |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |       |   |
|-----------|----|------|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------------|-------|---|
|           | h  | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | $\Delta A$ | E     | W |
| + 0       | 11 | 42.4 | 62 | 12 | 264   | 46 | 96    | 4  | -75 | -      | 4      | +                               | -1.0       | + 5.3 | - |
| 1         |    | 42.5 | 62 | 6  | 265   | 18 | 95    | 32 | -75 | -      | 2      | +                               | -0.9       | + 5.3 | - |
| 2         |    | 42.5 | 62 | 1  | 265   | 50 | 95    | 0  | -75 | -      | 1      | +                               | -0.8       | + 5.3 | - |
| 3         |    | 42.5 | 61 | 57 | 266   | 21 | 94    | 29 | -75 | +      | 1      | -                               | -0.7       | + 5.3 | - |
| 4         |    | 42.5 | 61 | 53 | 266   | 53 | 93    | 57 | -75 | +      | 3      | -                               | -0.6       | + 5.3 | - |
| 5         |    | 42.6 | 61 | 49 | 267   | 26 | 93    | 25 | -75 | +      | 4      | -                               | -0.5       | + 5.4 | - |
| 6         |    | 42.6 | 61 | 46 | 267   | 58 | 92    | 52 | -75 | +      | 6      | -                               | -0.4       | + 5.4 | - |
| 7         |    | 42.6 | 61 | 44 | 268   | 30 | 92    | 20 | -75 | +      | 8      | -                               | -0.3       | + 5.4 | - |
| 8         |    | 42.7 | 61 | 42 | 269   | 2  | 91    | 48 | -74 | +      | 9      | -                               | -0.3       | + 5.4 | - |
| 9         |    | 42.7 | 61 | 41 | 269   | 35 | 91    | 16 | -74 | +      | 11     | -                               | -0.2       | + 5.4 | - |
| 10        |    | 42.7 | 61 | 40 | 270   | 7  | 90    | 44 | -74 | +      | 13     | -                               | -0.1       | + 5.4 | - |
| 11        |    | 42.8 | 61 | 40 | 270   | 40 | 90    | 11 | -74 | +      | 15     | -                               | 0.0        | + 5.4 | - |
| 12        |    | 42.8 | 61 | 41 | 271   | 12 | 89    | 39 | -73 | +      | 16     | -                               | +0.1       | + 5.4 | - |
| 13        |    | 42.8 | 61 | 42 | 271   | 44 | 89    | 7  | -73 | +      | 18     | -                               | +0.2       | + 5.4 | - |
| 14        |    | 42.9 | 61 | 44 | 272   | 17 | 88    | 35 | -73 | +      | 20     | -                               | +0.3       | + 5.4 | - |
| 15        |    | 42.9 | 61 | 46 | 272   | 49 | 88    | 3  | -72 | +      | 21     | -                               | +0.4       | + 5.4 | - |
| 16        |    | 42.9 | 61 | 49 | 273   | 21 | 87    | 31 | -72 | +      | 23     | -                               | +0.5       | + 5.4 | - |
| 17        |    | 42.9 | 61 | 52 | 273   | 54 | 86    | 59 | -72 | +      | 25     | -                               | +0.6       | + 5.4 | - |
| 18        |    | 43.0 | 61 | 56 | 274   | 26 | 86    | 27 | -71 | +      | 26     | -                               | +0.7       | + 5.3 | - |
| 19        |    | 43.0 | 62 | 0  | 274   | 58 | 85    | 55 | -71 | +      | 28     | -                               | +0.8       | + 5.3 | - |
| +20       | 11 | 43.0 | 62 | 5  | 275   | 30 | 85    | 24 | -70 | +      | 29     | -                               | +0.9       | + 5.3 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| + 0       | +0.05      | 0.0        | +0.2         | -0.2         |
| 5         | 0.05       | 0.0        | 0.2          | 0.2          |
| 10        | 0.05       | 0.0        | 0.2          | 0.2          |
| 15        | 0.05       | 0.0        | 0.2          | 0.2          |
| +20       | +0.05      | 0.0        | +0.2         | -0.2         |



TABLE II.

|              | No.   | Star                   | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|--------------|-------|------------------------|------|---------------------------|---------------------------|
|              |       |                        |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 101 | E 132 | $\epsilon$ Coron. Bor. | 4.2  | 15 55.5                   | +27 1                     |
|              | W 72  | $\beta$ Geminor.       | 1.2  | 7 42.3                    | +28 9                     |

| $\varphi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |            |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|---------------------------------|------------|------------|
|           | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                      | $\Delta A$ | $\Delta A$ |
| + 0       | 11           | 48.3         | 65           | 39           | 240          | 6            | 121          | 11           | -64 | - 18 + | -5.1   | + 3.9 -                         |            |            |
| 1         |              | 48.3         | 65           | 9            | 240          | 29           | 120          | 48           | -65 | - 17 + | -5.0   | + 4.0 -                         |            |            |
| 2         |              | 48.4         | 64           | 39           | 240          | 54           | 120          | 23           | -65 | - 15 + | -5.0   | + 4.1 -                         |            |            |
| 3         |              | 48.4         | 64           | 9            | 241          | 19           | 119          | 58           | -65 | - 14 + | -4.9   | + 4.2 -                         |            |            |
| 4         |              | 48.4         | 63           | 40           | 241          | 44           | 119          | 33           | -65 | - 13 + | -4.8   | + 4.3 -                         |            |            |
| 5         |              | 48.5         | 63           | 11           | 242          | 11           | 119          | 6            | -66 | - 12 + | -4.8   | + 4.5 -                         |            |            |
| 6         |              | 48.5         | 62           | 43           | 242          | 38           | 118          | 39           | -66 | - 11 + | -4.7   | + 4.6 -                         |            |            |
| 7         |              | 48.6         | 62           | 15           | 243          | 6            | 118          | 12           | -66 | - 9 +  | -4.6   | + 4.7 -                         |            |            |
| 8         |              | 48.6         | 61           | 47           | 243          | 34           | 117          | 44           | -66 | - 8 +  | -4.6   | + 4.8 -                         |            |            |
| 9         |              | 48.7         | 61           | 20           | 244          | 3            | 117          | 15           | -66 | - 7 +  | -4.5   | + 4.9 -                         |            |            |
| 10        |              | 48.7         | 60           | 54           | 244          | 33           | 116          | 45           | -66 | - 6 +  | -4.4   | + 5.0 -                         |            |            |
| 11        |              | 48.8         | 60           | 28           | 245          | 3            | 116          | 15           | -66 | - 4 +  | -4.3   | + 5.1 -                         |            |            |
| 12        |              | 48.8         | 60           | 2            | 245          | 35           | 115          | 44           | -66 | - 3 +  | -4.2   | + 5.2 -                         |            |            |
| 13        |              | 48.9         | 59           | 37           | 246          | 6            | 115          | 12           | -66 | - 1 +  | -4.2   | + 5.4 -                         |            |            |
| 14        |              | 48.9         | 59           | 12           | 246          | 39           | 114          | 40           | -66 | 0      | -4.1   | + 5.5 -                         |            |            |
| 15        |              | 49.0         | 58           | 48           | 247          | 12           | 114          | 8            | -66 | + 2 -  | -4.0   | + 5.6 -                         |            |            |
| 16        |              | 49.0         | 58           | 24           | 247          | 46           | 113          | 34           | -66 | + 3 -  | -3.9   | + 5.7 -                         |            |            |
| 17        |              | 49.1         | 58           | 1            | 248          | 20           | 113          | 0            | -66 | + 5 -  | -3.8   | + 5.8 -                         |            |            |
| 18        |              | 49.1         | 57           | 39           | 248          | 56           | 112          | 25           | -66 | + 6 -  | -3.7   | + 5.9 -                         |            |            |
| 19        |              | 49.1         | 57           | 17           | 249          | 31           | 111          | 50           | -66 | + 8 -  | -3.6   | + 6.0 -                         |            |            |
| +20       | 11           | 49.2         | 56           | 55           | 250          | 8            | 111          | 14           | -66 | + 9 -  | -3.5   | + 6.2 -                         |            |            |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| + 0       | +0.05      | -0.2       | +0.2         | -0.1         |
| 5         | 0.05       | 0.2        | 0.2          | 0.1          |
| 10        | 0.05       | 0.2        | 0.2          | 0.2          |
| 15        | 0.05       | 0.1        | 0.2          | 0.2          |
| +20       | +0.05      | -0.1       | +0.2         | -0.2         |

|              | No.   | Star              | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|--------------|-------|-------------------|------|---------------------------|---------------------------|
|              |       |                   |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 102 | E 135 | $\beta$ Hereulis  | 2.8  | 16 28.1                   | +21 36                    |
|              | W 68  | $\delta$ Geminor. | 3.5  | 7 17.1                    | +22 5                     |

| $\varphi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |            |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|---------------------------------|------------|------------|
|           | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                      | $\Delta A$ | $\Delta A$ |
| + 0       | 11           | 52.5         | 71           | 1            | 247          | 6            | 113          | 25           | -69 | - 11 + | -3.9   | + 3.2 -                         |            |            |
| 1         |              | 52.5         | 70           | 38           | 247          | 25           | 113          | 6            | -69 | - 9 +  | -3.9   | + 3.2 -                         |            |            |
| 2         |              | 52.5         | 70           | 15           | 247          | 45           | 112          | 46           | -69 | - 8 +  | -3.8   | + 3.3 -                         |            |            |
| 3         |              | 52.5         | 69           | 52           | 248          | 5            | 112          | 26           | -69 | - 7 +  | -3.8   | + 3.4 -                         |            |            |
| 4         |              | 52.5         | 69           | 30           | 248          | 25           | 112          | 6            | -70 | - 6 +  | -3.7   | + 3.5 -                         |            |            |
| 5         |              | 52.5         | 69           | 7            | 248          | 47           | 111          | 45           | -70 | - 4 +  | -3.7   | + 3.6 -                         |            |            |
| 6         |              | 52.6         | 68           | 46           | 249          | 8            | 111          | 23           | -70 | - 3 +  | -3.6   | + 3.6 -                         |            |            |
| 7         |              | 52.6         | 68           | 24           | 249          | 30           | 111          | 1            | -70 | - 2 +  | -3.5   | + 3.7 -                         |            |            |
| 8         |              | 52.6         | 68           | 3            | 249          | 53           | 110          | 39           | -70 | 0      | -3.5   | + 3.8 -                         |            |            |
| 9         |              | 52.6         | 67           | 42           | 250          | 15           | 110          | 16           | -70 | + 1 -  | -3.4   | + 3.9 -                         |            |            |
| 10        |              | 52.6         | 67           | 22           | 250          | 39           | 109          | 52           | -70 | + 2 -  | -3.4   | + 3.9 -                         |            |            |
| 11        |              | 52.7         | 67           | 2            | 251          | 3            | 109          | 29           | -70 | + 4 -  | -3.3   | + 4.0 -                         |            |            |
| 12        |              | 52.7         | 66           | 42           | 251          | 27           | 109          | 5            | -69 | + 5 -  | -3.2   | + 4.1 -                         |            |            |
| 13        |              | 52.7         | 66           | 23           | 251          | 52           | 108          | 40           | -69 | + 7 -  | -3.2   | + 4.2 -                         |            |            |
| 14        |              | 52.7         | 66           | 5            | 252          | 17           | 108          | 15           | -69 | + 8 -  | -3.1   | + 4.2 -                         |            |            |
| 15        |              | 52.7         | 65           | 46           | 252          | 42           | 107          | 49           | -69 | + 9 -  | -3.0   | + 4.3 -                         |            |            |
| 16        |              | 52.8         | 65           | 28           | 253          | 8            | 107          | 24           | -69 | + 11 - | -2.9   | + 4.4 -                         |            |            |
| 17        |              | 52.8         | 65           | 11           | 253          | 35           | 106          | 57           | -69 | + 12 - | -2.9   | + 4.4 -                         |            |            |
| 18        |              | 52.8         | 64           | 54           | 254          | 2            | 106          | 31           | -68 | + 14 - | -2.8   | + 4.5 -                         |            |            |
| 19        |              | 52.8         | 64           | 37           | 254          | 29           | 106          | 4            | -68 | + 15 - | -2.7   | + 4.6 -                         |            |            |
| +20       | 11           | 52.8         | 64           | 21           | 254          | 57           | 105          | 36           | -68 | + 17 - | -2.6   | + 4.7 -                         |            |            |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| + 0       | +0.05      | -0.1       | +0.1         | -0.1         |
| 5         | 0.05       | 0.1        | 0.1          | 0.1          |
| 10        | 0.05       | 0.1        | 0.1          | 0.1          |
| 15        | 0.05       | 0.1        | 0.2          | 0.1          |
| +20       | +0.05      | -0.1       | +0.2         | -0.2         |



TABLE II.

|              | No.   | Star            | Mag. | $\alpha_{1950}$                   | $\delta_{1950}$ |
|--------------|-------|-----------------|------|-----------------------------------|-----------------|
| Pair No. 103 | E 119 | 109 Virginis    | 3.8  | 14 <sup>h</sup> 43.7 <sup>m</sup> | +2° 6'          |
|              | W 80  | $\theta$ Hydrae | 3.8  | 9 11.8                            | +2 32           |

| $\phi$ | S  |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |      |       |   |
|--------|----|------|----|----|-------|----|-------|----|-----|--------|--------|------------------------------|------|-------|---|
|        | h  | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                   | E    | W     |   |
| +0     | 11 | 57.7 | 42 | 10 | 266   | 52 | 93    | 46 | -75 | -      | 5      | +                            | -0.6 | +11.0 | - |
| 1      |    | 57.7 | 42 | 7  | 267   | 59 | 92    | 40 | -75 | -      | 2      | +                            | -0.4 | +11.0 | - |
| 2      |    | 57.7 | 42 | 5  | 269   | 5  | 91    | 34 | -75 | +      | 1      | -                            | -0.2 | +11.1 | - |
| 3      |    | 57.8 | 42 | 5  | 270   | 11 | 90    | 27 | -75 | +      | 4      | -                            | 0.0  | +11.1 | - |
| 4      |    | 57.8 | 42 | 5  | 271   | 18 | 89    | 21 | -75 | +      | 7      | -                            | +0.2 | +11.1 | - |
| 5      |    | 57.8 | 42 | 7  | 272   | 24 | 88    | 15 | -75 | +      | 10     | -                            | +0.4 | +11.1 | - |
| 6      |    | 57.8 | 42 | 10 | 273   | 30 | 87    | 8  | -75 | +      | 13     | -                            | +0.6 | +11.0 | - |
| 7      |    | 57.9 | 42 | 13 | 274   | 37 | 86    | 2  | -74 | +      | 16     | -                            | +0.7 | +11.0 | - |
| 8      |    | 57.9 | 42 | 18 | 275   | 42 | 84    | 57 | -74 | +      | 18     | -                            | +0.9 | +10.9 | - |
| 9      |    | 57.9 | 42 | 25 | 276   | 48 | 83    | 51 | -74 | +      | 21     | -                            | +1.1 | +10.9 | - |
| 10     |    | 57.9 | 42 | 32 | 277   | 53 | 82    | 46 | -73 | +      | 24     | -                            | +1.3 | +10.8 | - |
| 11     |    | 57.9 | 42 | 40 | 278   | 58 | 81    | 42 | -73 | +      | 27     | -                            | +1.5 | +10.7 | - |
| 12     |    | 58.0 | 42 | 50 | 280   | 2  | 80    | 38 | -72 | +      | 30     | -                            | +1.7 | +10.6 | - |
| 13     |    | 58.0 | 43 | 1  | 281   | 5  | 79    | 34 | -72 | +      | 32     | -                            | +1.9 | +10.5 | - |
| 14     |    | 58.0 | 43 | 12 | 282   | 8  | 78    | 32 | -71 | +      | 35     | -                            | +2.0 | +10.4 | - |
| 15     |    | 58.0 | 43 | 25 | 283   | 10 | 77    | 29 | -71 | +      | 37     | -                            | +2.2 | +10.3 | - |
| 16     |    | 58.1 | 43 | 39 | 284   | 12 | 76    | 28 | -70 | +      | 40     | -                            | +2.4 | +10.2 | - |
| 17     |    | 58.1 | 43 | 54 | 285   | 13 | 75    | 27 | -69 | +      | 42     | -                            | +2.6 | +10.1 | - |
| 18     |    | 58.1 | 44 | 10 | 286   | 13 | 74    | 28 | -69 | +      | 44     | -                            | +2.7 | +9.9  | - |
| 19     |    | 58.1 | 44 | 27 | 287   | 12 | 73    | 29 | -68 | +      | 46     | -                            | +2.9 | +9.8  | - |
| +20    | 11 | 58.2 | 44 | 45 | 288   | 10 | 72    | 31 | -67 | +      | 48     | -                            | +3.1 | +9.6  | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| +0     | 0.05       | 0.0        | +0.4         | -0.4         |
| 5      | 0.05       | 0.0        | 0.4          | 0.4          |
| 10     | 0.05       | 0.0        | 0.4          | 0.4          |
| 15     | 0.05       | +0.1       | 0.4          | 0.4          |
| +20    | +0.05      | +0.1       | +0.3         | -0.3         |

|              | No.   | Star            | Mag. | $\alpha_{1950}$                   | $\delta_{1950}$ |
|--------------|-------|-----------------|------|-----------------------------------|-----------------|
| Pair No. 104 | E 129 | $\mu$ Serpentis | 3.6  | 15 <sup>h</sup> 47.0 <sup>m</sup> | -3° 17'         |
|              | W 74  | Bradley 1197    | 4.0  | 8 23.2                            | -3 45           |

| $\phi$ | S  |     | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |      |      |   |
|--------|----|-----|----|----|-------|----|-------|----|-----|--------|--------|------------------------------|------|------|---|
|        | h  | m   | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                   | E    | W    |   |
| +0     | 12 | 5.1 | 56 | 11 | 273   | 57 | 85    | 30 | -75 | +      | 4      | -                            | +0.8 | +6.7 | - |
| 1      |    | 5.0 | 56 | 16 | 274   | 37 | 84    | 50 | -75 | +      | 6      | -                            | +0.9 | +6.6 | - |
| 2      |    | 5.0 | 56 | 21 | 275   | 16 | 84    | 10 | -75 | +      | 8      | -                            | +1.0 | +6.6 | - |
| 3      |    | 5.0 | 56 | 27 | 275   | 56 | 83    | 30 | -75 | +      | 10     | -                            | +1.1 | +6.6 | - |
| 4      |    | 5.0 | 56 | 34 | 276   | 35 | 82    | 51 | -74 | +      | 12     | -                            | +1.2 | +6.6 | - |
| 5      |    | 5.0 | 56 | 42 | 277   | 15 | 82    | 11 | -74 | +      | 13     | -                            | +1.3 | +6.5 | - |
| 6      |    | 4.9 | 56 | 50 | 277   | 54 | 81    | 32 | -74 | +      | 15     | -                            | +1.4 | +6.5 | - |
| 7      |    | 4.9 | 56 | 59 | 278   | 32 | 80    | 54 | -74 | +      | 17     | -                            | +1.5 | +6.4 | - |
| 8      |    | 4.9 | 57 | 8  | 279   | 11 | 80    | 15 | -73 | +      | 19     | -                            | +1.6 | +6.4 | - |
| 9      |    | 4.9 | 57 | 18 | 279   | 49 | 79    | 37 | -73 | +      | 20     | -                            | +1.7 | +6.3 | - |
| 10     |    | 4.9 | 57 | 29 | 280   | 26 | 78    | 59 | -72 | +      | 22     | -                            | +1.9 | +6.3 | - |
| 11     |    | 4.8 | 57 | 41 | 281   | 4  | 78    | 22 | -72 | +      | 24     | -                            | +2.0 | +6.2 | - |
| 12     |    | 4.8 | 57 | 53 | 281   | 41 | 77    | 45 | -72 | +      | 25     | -                            | +2.1 | +6.1 | - |
| 13     |    | 4.8 | 58 | 5  | 282   | 17 | 77    | 8  | -71 | +      | 27     | -                            | +2.2 | +6.1 | - |
| 14     |    | 4.8 | 58 | 19 | 282   | 53 | 76    | 32 | -71 | +      | 29     | -                            | +2.3 | +6.0 | - |
| 15     |    | 4.8 | 58 | 33 | 283   | 29 | 75    | 56 | -70 | +      | 30     | -                            | +2.4 | +5.9 | - |
| 16     |    | 4.7 | 58 | 47 | 284   | 5  | 75    | 20 | -70 | +      | 32     | -                            | +2.5 | +5.9 | - |
| 17     |    | 4.7 | 59 | 3  | 284   | 40 | 74    | 45 | -69 | +      | 34     | -                            | +2.6 | +5.8 | - |
| 18     |    | 4.7 | 59 | 18 | 285   | 14 | 74    | 11 | -69 | +      | 35     | -                            | +2.7 | +5.7 | - |
| 19     |    | 4.7 | 59 | 35 | 285   | 48 | 73    | 36 | -68 | +      | 36     | -                            | +2.8 | +5.6 | - |
| +20    | 12 | 4.6 | 59 | 52 | 286   | 21 | 73    | 3  | -67 | +      | 38     | -                            | +2.9 | +5.5 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| +0     | 0.05       | 0.0        | +0.2         | -0.2         |
| 5      | 0.05       | 0.0        | 0.2          | 0.2          |
| 10     | 0.05       | +0.1       | 0.2          | 0.2          |
| 15     | 0.05       | 0.1        | 0.2          | 0.2          |
| +20    | +0.05      | +0.1       | +0.2         | -0.2         |



TABLE II.

|              | No.   | Star               | Mag. | $\alpha_{1950}$ | $\delta_{1950}$ |
|--------------|-------|--------------------|------|-----------------|-----------------|
| Pair No. 105 | E 126 | $\alpha$ Serpentis | 2.8  | 15 41.8         | +6 35           |
|              | W 77  | $\epsilon$ Hydræ   | 3.5  | 8 44.1          | +6 36           |

| $\phi$ | S  |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |      |      |   |
|--------|----|------|----|----|-------|----|-------|----|-----|--------|--------|------------------------------|------|------|---|
|        | h  | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                   | E    | W    |   |
| +0     | 12 | 13.0 | 53 | 7  | 261   | 46 | 98    | 16 | -74 | -      | 8      | +                            | -1.4 | +7.4 | - |
| 1      |    | 13.0 | 52 | 59 | 262   | 31 | 97    | 31 | -74 | -      | 6      | +                            | -1.3 | +7.5 | - |
| 2      |    | 13.0 | 52 | 52 | 263   | 16 | 96    | 46 | -75 | -      | 4      | +                            | -1.2 | +7.5 | - |
| 3      |    | 13.0 | 52 | 45 | 264   | 1  | 96    | 1  | -75 | -      | 2      | +                            | -1.0 | +7.6 | - |
| 4      |    | 13.0 | 52 | 39 | 264   | 46 | 95    | 15 | -75 |        | 0      |                              | -0.9 | +7.6 | - |
| 5      |    | 13.0 | 52 | 34 | 265   | 32 | 94    | 30 | -75 | +      | 2      | -                            | -0.8 | +7.6 | - |
| 6      |    | 13.0 | 52 | 30 | 266   | 18 | 93    | 44 | -75 | +      | 4      | -                            | -0.7 | +7.7 | - |
| 7      |    | 13.0 | 52 | 26 | 267   | 4  | 92    | 58 | -74 | +      | 6      | -                            | -0.5 | +7.7 | - |
| 8      |    | 13.0 | 52 | 24 | 267   | 50 | 92    | 12 | -74 | +      | 8      | -                            | -0.4 | +7.7 | - |
| 9      |    | 13.0 | 52 | 22 | 268   | 36 | 91    | 26 | -74 | +      | 10     | -                            | -0.3 | +7.7 | - |
| 10     |    | 13.0 | 52 | 21 | 269   | 22 | 90    | 39 | -74 | +      | 12     | -                            | -0.1 | +7.7 | - |
| 11     |    | 13.0 | 52 | 20 | 270   | 9  | 89    | 53 | -74 | +      | 15     | -                            | 0.0  | +7.7 | - |
| 12     |    | 13.0 | 52 | 21 | 270   | 55 | 89    | 7  | -73 | +      | 17     | -                            | +0.2 | +7.7 | - |
| 13     |    | 13.0 | 52 | 22 | 271   | 41 | 88    | 20 | -73 | +      | 19     | -                            | +0.3 | +7.7 | - |
| 14     |    | 13.0 | 52 | 24 | 272   | 27 | 87    | 34 | -73 | +      | 21     | -                            | +0.4 | +7.7 | - |
| 15     |    | 13.0 | 52 | 27 | 273   | 14 | 86    | 48 | -72 | +      | 23     | -                            | +0.6 | +7.7 | - |
| 16     |    | 13.0 | 52 | 31 | 274   | 0  | 86    | 2  | -72 | +      | 25     | -                            | +0.7 | +7.7 | - |
| 17     |    | 13.0 | 52 | 36 | 274   | 45 | 85    | 16 | -71 | +      | 27     | -                            | +0.8 | +7.6 | - |
| 18     |    | 13.0 | 52 | 41 | 275   | 31 | 84    | 31 | -71 | +      | 29     | -                            | +1.0 | +7.6 | - |
| 19     |    | 13.0 | 52 | 47 | 276   | 16 | 83    | 45 | -70 | +      | 31     | -                            | +1.1 | +7.6 | - |
| +20    | 12 | 13.0 | 52 | 54 | 277   | 2  | 83    | 0  | -70 | +      | 32     | -                            | +1.2 | +7.5 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| 0      | m          | '          | '            | '            |
| +0     | +0.05      | -0.1       | +0.2         | -0.3         |
| 5      | 0.05       | 0.0        | 0.2          | 0.3          |
| 10     | 0.05       | 0.0        | 0.2          | 0.3          |
| 15     | 0.05       | 0.0        | 0.2          | 0.3          |
| +20    | +0.05      | 0.0        | +0.2         | -0.3         |

DATA REQUIRED FOR OBSERVATION.

|              | No.   | Star           | Mag. | $\alpha_{1950}$ | $\delta_{1950}$ |
|--------------|-------|----------------|------|-----------------|-----------------|
| Pair No. 106 | E 123 | $\beta$ Libræ  | 2.7  | 15 14.3         | -9 12           |
|              | W 82  | $\alpha$ Hydræ | 2.2  | 9 25.1          | -8 26           |

| $\phi$ | S  |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |      |      |   |
|--------|----|------|----|----|-------|----|-------|----|-----|--------|--------|------------------------------|------|------|---|
|        | h  | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                   | E    | W    |   |
| +0     | 12 | 20.0 | 44 | 58 | 283   | 5  | 78    | 1  | -73 | +      | 17     | -                            | +2.2 | +9.8 | - |
| 1      |    | 20.0 | 45 | 12 | 284   | 3  | 77    | 3  | -73 | +      | 19     | -                            | +2.3 | +9.7 | - |
| 2      |    | 20.1 | 45 | 26 | 285   | 1  | 76    | 5  | -73 | +      | 22     | -                            | +2.5 | +9.5 | - |
| 3      |    | 20.1 | 45 | 42 | 285   | 58 | 75    | 9  | -72 | +      | 24     | -                            | +2.7 | +9.4 | - |
| 4      |    | 20.1 | 45 | 58 | 286   | 54 | 74    | 13 | -72 | +      | 26     | -                            | +2.8 | +9.3 | - |
| 5      |    | 20.2 | 46 | 15 | 287   | 49 | 73    | 17 | -71 | +      | 29     | -                            | +3.0 | +9.2 | - |
| 6      |    | 20.2 | 46 | 34 | 288   | 43 | 72    | 23 | -71 | +      | 31     | -                            | +3.1 | +9.0 | - |
| 7      |    | 20.2 | 46 | 53 | 289   | 37 | 71    | 29 | -70 | +      | 33     | -                            | +3.3 | +8.9 | - |
| 8      |    | 20.3 | 47 | 13 | 290   | 30 | 70    | 37 | -70 | +      | 35     | -                            | +3.4 | +8.7 | - |
| 9      |    | 20.3 | 47 | 33 | 291   | 22 | 69    | 45 | -69 | +      | 37     | -                            | +3.5 | +8.6 | - |
| 10     |    | 20.4 | 47 | 55 | 292   | 13 | 68    | 54 | -68 | +      | 38     | -                            | +3.7 | +8.4 | - |
| 11     |    | 20.4 | 48 | 18 | 293   | 3  | 68    | 5  | -68 | +      | 40     | -                            | +3.8 | +8.3 | - |
| 12     |    | 20.4 | 48 | 41 | 293   | 52 | 67    | 16 | -67 | +      | 42     | -                            | +4.0 | +8.1 | - |
| 13     |    | 20.5 | 49 | 5  | 294   | 40 | 66    | 28 | -66 | +      | 44     | -                            | +4.1 | +7.9 | - |
| 14     |    | 20.5 | 49 | 30 | 295   | 27 | 65    | 41 | -66 | +      | 45     | -                            | +4.2 | +7.8 | - |
| 15     |    | 20.6 | 49 | 56 | 296   | 13 | 64    | 55 | -65 | +      | 47     | -                            | +4.3 | +7.6 | - |
| 16     |    | 20.6 | 50 | 22 | 296   | 58 | 64    | 11 | -64 | +      | 48     | -                            | +4.5 | +7.5 | - |
| 17     |    | 20.6 | 50 | 49 | 297   | 42 | 63    | 27 | -64 | +      | 49     | -                            | +4.6 | +7.3 | - |
| 18     |    | 20.7 | 51 | 17 | 298   | 26 | 62    | 44 | -63 | +      | 51     | -                            | +4.7 | +7.1 | - |
| 19     |    | 20.7 | 51 | 45 | 299   | 8  | 62    | 2  | -62 | +      | 52     | -                            | +4.8 | +7.0 | - |
| +20    | 12 | 20.8 | 52 | 14 | 299   | 49 | 61    | 21 | -61 | +      | 53     | -                            | +4.9 | +6.8 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| 0      | m          | '          | '            | '            |
| +0     | +0.05      | +0.1       | +0.3         | -0.4         |
| 5      | 0.05       | 0.1        | 0.3          | 0.3          |
| 10     | 0.05       | 0.1        | 0.3          | 0.3          |
| 15     | 0.05       | 0.2        | 0.2          | 0.3          |
| +20    | +0.05      | +0.2       | +0.2         | -0.3         |



TABLE II.

|              | No.   | Star              | Mag. | $\alpha_{1950}$                                     | $\delta_{1950}$                                     |
|--------------|-------|-------------------|------|---|---|
|              |       |                   |      | <sup>h</sup> <sub>h</sub> <sup>m</sup> <sub>m</sub> | <sup>°</sup> <sub>°</sub> <sup>'</sup> <sub>'</sub> |
| Pair No. 107 | E 134 | $\gamma$ Herculis | 3.8  | 16 19.7   | +19 16  |
|              | W 76  | $\delta$ Cancri   | 4.2  | 8 41.8  | +18 20  |

| $\varphi$    | S                         | z                         | $A_E$                     | $A_W$                     | dz           | $dA_E$       | $dA_W$       | Var. for $\Delta\varphi = +10'$ |              |              |
|--------------|---------------------------|---------------------------|---------------------------|---------------------------|--------------|--------------|--------------|---------------------------------|--------------|--------------|
|              |                           |                           |                           |                           |              |              |              | $\Delta z$                      | $\Delta A$   |              |
| <sup>°</sup> | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>'</sup> | <sup>'</sup> | <sup>'</sup> | <sup>'</sup>                    | <sup>'</sup> | <sup>'</sup> |
| +0           | 12 31.2                   | 59 46                     | 247 33                    | 111 21                    | -70          | -17          | +            | -3.7                            | +5.4         | -            |
| 1            | 31.2                      | 59 24                     | 248 5                     | 110 48                    | -70          | -15          | +            | -3.6                            | +5.5         | -            |
| 2            | 31.1                      | 59 2                      | 248 39                    | 110 15                    | -70          | -14          | +            | -3.6                            | +5.6         | -            |
| 3            | 31.1                      | 58 41                     | 249 13                    | 109 41                    | -70          | -12          | +            | -3.5                            | +5.7         | -            |
| 4            | 31.0                      | 58 20                     | 249 47                    | 109 6                     | -70          | -11          | +            | -3.4                            | +5.8         | -            |
| 5            | 31.0                      | 58 1                      | 250 22                    | 108 31                    | -71          | -9           | +            | -3.3                            | +5.9         | -            |
| 6            | 31.0                      | 57 41                     | 250 58                    | 107 55                    | -71          | -8           | +            | -3.2                            | +6.0         | -            |
| 7            | 30.9                      | 57 22                     | 251 34                    | 107 19                    | -71          | -6           | +            | -3.1                            | +6.1         | -            |
| 8            | 30.9                      | 57 4                      | 252 11                    | 106 42                    | -71          | -4           | +            | -3.0                            | +6.2         | -            |
| 9            | 30.8                      | 56 47                     | 252 48                    | 106 5                     | -71          | -3           | +            | -2.9                            | +6.3         | -            |
| 10           | 30.8                      | 56 30                     | 253 26                    | 105 27                    | -71          | -1           | +            | -2.8                            | +6.3         | -            |
| 11           | 30.8                      | 56 14                     | 254 4                     | 104 48                    | -71          | +1           | -            | -2.7                            | +6.4         | -            |
| 12           | 30.7                      | 55 58                     | 254 43                    | 104 9                     | -71          | +3           | -            | -2.5                            | +6.5         | -            |
| 13           | 30.7                      | 55 43                     | 255 22                    | 103 30                    | -71          | +5           | -            | -2.4                            | +6.6         | -            |
| 14           | 30.6                      | 55 29                     | 256 2                     | 102 50                    | -71          | +6           | -            | -2.3                            | +6.7         | -            |
| 15           | 30.6                      | 55 15                     | 256 42                    | 102 9                     | -71          | +8           | -            | -2.2                            | +6.7         | -            |
| 16           | 30.6                      | 55 3                      | 257 23                    | 101 28                    | -70          | +10          | -            | -2.1                            | +6.8         | -            |
| 17           | 30.5                      | 54 50                     | 258 4                     | 100 47                    | -70          | +12          | -            | -2.0                            | +6.9         | -            |
| 18           | 30.5                      | 54 39                     | 258 45                    | 100 5                     | -70          | +14          | -            | -1.9                            | +6.9         | -            |
| 19           | 30.4                      | 54 28                     | 259 27                    | 99 23                     | -70          | +16          | -            | -1.7                            | +7.0         | -            |
| +20          | 12 30.4                   | 54 18                     | 260 9                     | 98 40                     | -70          | +17          | -            | -1.6                            | +7.1         | -            |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$    | $\delta S$   | $\delta z$   | $\delta A_E$ | $\delta A_W$ |
|--------------|--------------|--------------|--------------|--------------|
| <sup>°</sup> | <sup>m</sup> | <sup>'</sup> | <sup>'</sup> | <sup>'</sup> |
| +0           | +0.05        | -0.1         | +0.1         | -0.2         |
| 5            | 0.05         | 0.1          | 0.2          | 0.3          |
| 10           | 0.05         | 0.1          | 0.2          | 0.3          |
| 15           | 0.05         | 0.1          | 0.2          | 0.3          |
| +20          | +0.05        | -0.1         | +0.2         | -0.3         |

DATA REQUIRED FOR OBSERVATION.

|              | No.   | Star              | Mag. | $\alpha_{1950}$                                     | $\delta_{1950}$                                     |
|--------------|-------|-------------------|------|---|---|
|              |       |                   |      | <sup>h</sup> <sub>h</sub> <sup>m</sup> <sub>m</sub> | <sup>°</sup> <sub>°</sub> <sup>'</sup> <sub>'</sub> |
| Pair No. 108 | E 138 | $\kappa$ Ophiuchi | 3.4  | 16 55.3   | +9 27   |
|              | W 73  | $\beta$ Cancri    | 3.8  | 8 13.8  | +9 20   |

| $\varphi$    | S                         | z                         | $A_E$                     | $A_W$                     | dz           | $dA_E$       | $dA_W$       | Var. for $\Delta\varphi = +10'$ |              |              |
|--------------|---------------------------|---------------------------|---------------------------|---------------------------|--------------|--------------|--------------|---------------------------------|--------------|--------------|
|              |                           |                           |                           |                           |              |              |              | $\Delta z$                      | $\Delta A$   |              |
| <sup>°</sup> | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>'</sup> | <sup>'</sup> | <sup>'</sup> | <sup>'</sup>                    | <sup>'</sup> | <sup>'</sup> |
| +0           | 12 34.6                   | 66 9                      | 259 40                    | 100 13                    | -74          | -6           | +            | -1.8                            | +4.4         | -            |
| 1            | 34.6                      | 65 59                     | 260 6                     | 99 47                     | -74          | -5           | +            | -1.7                            | +4.4         | -            |
| 2            | 34.6                      | 65 49                     | 260 32                    | 99 21                     | -74          | -3           | +            | -1.6                            | +4.4         | -            |
| 3            | 34.6                      | 65 39                     | 260 59                    | 98 54                     | -74          | -2           | +            | -1.6                            | +4.5         | -            |
| 4            | 34.6                      | 65 30                     | 261 26                    | 98 27                     | -74          | 0            |              | -1.5                            | +4.5         | -            |
| 5            | 34.6                      | 65 22                     | 261 53                    | 98 0                      | -74          | +2           | -            | -1.4                            | +4.5         | -            |
| 6            | 34.6                      | 65 13                     | 262 20                    | 97 32                     | -74          | +3           | -            | -1.3                            | +4.6         | -            |
| 7            | 34.5                      | 65 6                      | 262 48                    | 97 5                      | -74          | +5           | -            | -1.2                            | +4.6         | -            |
| 8            | 34.5                      | 64 58                     | 263 16                    | 96 37                     | -74          | +6           | -            | -1.2                            | +4.6         | -            |
| 9            | 34.5                      | 64 52                     | 263 43                    | 96 9                      | -74          | +8           | -            | -1.1                            | +4.7         | -            |
| 10           | 34.5                      | 64 45                     | 264 12                    | 95 41                     | -73          | +9           | -            | -1.0                            | +4.7         | -            |
| 11           | 34.5                      | 64 40                     | 264 40                    | 95 13                     | -73          | +11          | -            | -0.9                            | +4.7         | -            |
| 12           | 34.5                      | 64 34                     | 265 8                     | 94 45                     | -73          | +13          | -            | -0.8                            | +4.7         | -            |
| 13           | 34.5                      | 64 30                     | 265 37                    | 94 16                     | -73          | +14          | -            | -0.8                            | +4.8         | -            |
| 14           | 34.5                      | 64 25                     | 266 5                     | 93 48                     | -73          | +16          | -            | -0.7                            | +4.8         | -            |
| 15           | 34.5                      | 64 22                     | 266 34                    | 93 19                     | -72          | +17          | -            | -0.6                            | +4.8         | -            |
| 16           | 34.5                      | 64 18                     | 267 3                     | 92 50                     | -72          | +19          | -            | -0.5                            | +4.8         | -            |
| 17           | 34.5                      | 64 16                     | 267 31                    | 92 21                     | -72          | +21          | -            | -0.4                            | +4.8         | -            |
| 18           | 34.5                      | 64 13                     | 268 0                     | 91 52                     | -71          | +22          | -            | -0.3                            | +4.8         | -            |
| 19           | 34.5                      | 64 12                     | 268 29                    | 91 23                     | -71          | +24          | -            | -0.3                            | +4.8         | -            |
| +20          | 12 34.5                   | 64 10                     | 268 58                    | 90 54                     | -70          | +25          | -            | -0.2                            | +4.8         | -            |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$    | $\delta S$   | $\delta z$   | $\delta A_E$ | $\delta A_W$ |
|--------------|--------------|--------------|--------------|--------------|
| <sup>°</sup> | <sup>m</sup> | <sup>'</sup> | <sup>'</sup> | <sup>'</sup> |
| +0           | +0.05        | -0.1         | +0.1         | -0.2         |
| 5            | 0.05         | -0.1         | 0.1          | 0.2          |
| 10           | 0.05         | 0.0          | 0.1          | 0.2          |
| 15           | 0.05         | 0.0          | 0.1          | 0.2          |
| +20          | +0.05        | 0.0          | +0.1         | -0.2         |



|              | No.   | Star                 | Mag. | $\alpha_{1950}$                    | $\delta_{1950}$      |
|--------------|-------|----------------------|------|------------------------------------|----------------------|
| Pair No. 109 | E 125 | $\alpha$ Coron. Bor. | 2.3  | 15 <sup>h</sup> 32. <sup>m</sup> 6 | +26 <sup>o</sup> 53' |
|              | W 85  | $\mu$ Leonis         | 4.1  | 9 49.9                             | +26 15               |

| $\phi$ | S  |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | d $A_E$ | d $A_W$ | Var. for $\Delta\phi = +10'$ |      |   |      |   |
|--------|----|------|----|----|-------|----|-------|----|-----|---------|---------|------------------------------|------|---|------|---|
|        | h  | m    | o  | '  | o     | '  | o     | '  |     |         |         | $\Delta z$                   | E    | W |      |   |
| +0     | 12 | 41.9 | 49 | 31 | 233   | 31 | 125   | 32 | -60 | -       | 39      | +                            | -5.9 | + | 6.9  | - |
| 1      |    | 41.9 | 48 | 56 | 234   | 13 | 124   | 50 | -61 | -       | 37      | +                            | -5.8 | + | 7.1  | - |
| 2      |    | 41.9 | 48 | 21 | 234   | 57 | 124   | 7  | -62 | -       | 36      | +                            | -5.7 | + | 7.3  | - |
| 3      |    | 41.8 | 47 | 48 | 235   | 41 | 123   | 23 | -62 | -       | 35      | +                            | -5.6 | + | 7.5  | - |
| 4      |    | 41.8 | 47 | 15 | 236   | 27 | 122   | 37 | -63 | -       | 33      | +                            | -5.5 | + | 7.8  | - |
| 5      |    | 41.8 | 46 | 42 | 237   | 14 | 121   | 49 | -63 | -       | 32      | +                            | -5.4 | + | 8.0  | - |
| 6      |    | 41.8 | 46 | 10 | 238   | 2  | 121   | 1  | -63 | -       | 31      | +                            | -5.2 | + | 8.2  | - |
| 7      |    | 41.7 | 45 | 39 | 238   | 52 | 120   | 11 | -64 | -       | 29      | +                            | -5.1 | + | 8.4  | - |
| 8      |    | 41.7 | 45 | 9  | 239   | 43 | 119   | 20 | -64 | -       | 27      | +                            | -5.0 | + | 8.6  | - |
| 9      |    | 41.6 | 44 | 40 | 240   | 36 | 118   | 27 | -65 | -       | 25      | +                            | -4.8 | + | 8.9  | - |
| 10     |    | 41.6 | 44 | 11 | 241   | 29 | 117   | 34 | -65 | -       | 24      | +                            | -4.7 | + | 9.1  | - |
| 11     |    | 41.6 | 43 | 43 | 242   | 24 | 116   | 38 | -65 | -       | 22      | +                            | -4.6 | + | 9.3  | - |
| 12     |    | 41.5 | 43 | 16 | 243   | 21 | 115   | 42 | -66 | -       | 20      | +                            | -4.4 | + | 9.6  | - |
| 13     |    | 41.5 | 42 | 50 | 244   | 19 | 114   | 44 | -66 | -       | 18      | +                            | -4.3 | + | 9.8  | - |
| 14     |    | 41.5 | 42 | 25 | 245   | 18 | 113   | 44 | -66 | -       | 15      | +                            | -4.1 | + | 10.0 | - |
| 15     |    | 41.4 | 42 | 1  | 246   | 18 | 112   | 44 | -66 | -       | 13      | +                            | -4.0 | + | 10.2 | - |
| 16     |    | 41.4 | 41 | 38 | 247   | 20 | 111   | 42 | -67 | -       | 11      | +                            | -3.8 | + | 10.4 | - |
| 17     |    | 41.4 | 41 | 16 | 248   | 23 | 110   | 39 | -67 | -       | 8       | +                            | -3.6 | + | 10.6 | - |
| 18     |    | 41.3 | 40 | 55 | 249   | 27 | 109   | 34 | -67 | -       | 6       | +                            | -3.4 | + | 10.9 | - |
| 19     |    | 41.3 | 40 | 35 | 250   | 32 | 108   | 28 | -67 | -       | 3       | +                            | -3.2 | + | 11.1 | - |
| +20    | 12 | 41.3 | 40 | 16 | 251   | 39 | 107   | 21 | -67 | -       | 0       | +                            | -3.1 | + | 11.3 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| o      | m          | '          | '            | '            |
| +0     | +0.05      | -0.2       | -0.2         | -0.3         |
| 5      | 0.05       | 0.2        | 0.2          | 0.3          |
| 10     | 0.05       | 0.2        | 0.2          | 0.4          |
| 15     | 0.05       | 0.1        | 0.3          | 0.4          |
| +20    | +0.05      | -0.1       | -0.3         | -0.4         |

|              | No.   | Star               | Mag. | $\alpha_{1950}$                    | $\delta_{1950}$    |
|--------------|-------|--------------------|------|------------------------------------|--------------------|
| Pair No. 110 | E 136 | $\lambda$ Ophiuchi | 3.9  | 16 <sup>h</sup> 28. <sup>m</sup> 4 | +2 <sup>o</sup> 6' |
|              | W 80  | $\theta$ Hydræ     | 3.8  | 9 11.8                             | +2 32              |

| $\phi$ | S  |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | d $A_E$ | d $A_W$ | Var. for $\Delta\phi = +10'$ |      |   |     |   |
|--------|----|------|----|----|-------|----|-------|----|-----|---------|---------|------------------------------|------|---|-----|---|
|        | h  | m    | o  | '  | o     | '  | o     | '  |     |         |         | $\Delta z$                   | E    | W |     |   |
| +0     | 12 | 50.1 | 55 | 14 | 267   | 27 | 93    | 5  | -75 | -       | 3       | +                            | -0.5 | + | 6.9 | - |
| 1      |    | 50.1 | 55 | 12 | 268   | 9  | 92    | 23 | -75 | -       | 1       | +                            | -0.4 | + | 7.0 | - |
| 2      |    | 50.1 | 55 | 10 | 268   | 51 | 91    | 41 | -75 | +       | 1       | -                            | -0.2 | + | 7.0 | - |
| 3      |    | 50.1 | 55 | 9  | 269   | 33 | 91    | 0  | -75 | +       | 3       | -                            | -0.1 | + | 7.0 | - |
| 4      |    | 50.1 | 55 | 8  | 270   | 14 | 90    | 18 | -75 | +       | 5       | -                            | 0.0  | + | 7.0 | - |
| 5      |    | 50.1 | 55 | 9  | 270   | 56 | 89    | 36 | -75 | +       | 7       | -                            | +0.1 | + | 7.0 | - |
| 6      |    | 50.2 | 55 | 10 | 271   | 38 | 88    | 54 | -75 | +       | 9       | -                            | +0.2 | + | 7.0 | - |
| 7      |    | 50.2 | 55 | 11 | 272   | 20 | 87    | 13 | -74 | +       | 11      | -                            | +0.4 | + | 6.9 | - |
| 8      |    | 50.2 | 55 | 14 | 273   | 1  | 86    | 31 | -74 | +       | 13      | -                            | +0.5 | + | 6.9 | - |
| 9      |    | 50.2 | 55 | 17 | 273   | 43 | 86    | 50 | -74 | +       | 15      | -                            | +0.6 | + | 6.9 | - |
| 10     |    | 50.2 | 55 | 21 | 274   | 24 | 86    | 8  | -74 | +       | 17      | -                            | +0.7 | + | 6.9 | - |
| 11     |    | 50.3 | 55 | 26 | 275   | 6  | 85    | 27 | -73 | +       | 19      | -                            | +0.8 | + | 6.9 | - |
| 12     |    | 50.3 | 55 | 31 | 275   | 47 | 84    | 46 | -73 | +       | 21      | -                            | +1.0 | + | 6.8 | - |
| 13     |    | 50.3 | 55 | 37 | 276   | 28 | 84    | 5  | -73 | +       | 23      | -                            | +1.1 | + | 6.8 | - |
| 14     |    | 50.3 | 55 | 44 | 277   | 9  | 83    | 24 | -72 | +       | 24      | -                            | +1.2 | + | 6.8 | - |
| 15     |    | 50.3 | 55 | 52 | 277   | 49 | 82    | 44 | -72 | +       | 26      | -                            | +1.3 | + | 6.7 | - |
| 16     |    | 50.4 | 56 | 0  | 278   | 30 | 82    | 4  | -71 | +       | 28      | -                            | +1.4 | + | 6.7 | - |
| 17     |    | 50.4 | 56 | 9  | 279   | 10 | 81    | 24 | -71 | +       | 30      | -                            | +1.5 | + | 6.6 | - |
| 18     |    | 50.4 | 56 | 19 | 279   | 49 | 80    | 45 | -70 | +       | 31      | -                            | +1.7 | + | 6.6 | - |
| 19     |    | 50.4 | 56 | 29 | 280   | 28 | 80    | 5  | -70 | +       | 33      | -                            | +1.8 | + | 6.5 | - |
| +20    | 12 | 50.4 | 56 | 40 | 281   | 7  | 79    | 27 | -69 | +       | 35      | -                            | +1.9 | + | 6.5 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| o      | m          | '          | '            | '            |
| +0     | +0.05      | 0.0        | +0.2         | -0.3         |
| 5      | 0.05       | 0.0        | 0.2          | 0.3          |
| 10     | 0.05       | 0.0        | 0.2          | 0.3          |
| 15     | 0.05       | 0.0        | 0.2          | 0.3          |
| +20    | +0.05      | +0.1       | +0.1         | -0.3         |



TABLE II.

| Pair No. 111 | No. | Star          | Mag. | $\alpha_{1950}$ |              | $\delta_{1950}$ |              |
|--------------|-----|---------------|------|-----------------|--------------|-----------------|--------------|
|              |     |               |      | <sup>h</sup>    | <sup>m</sup> | <sup>°</sup>    | <sup>'</sup> |
| E            | 119 | 109 Virginis  | 3.8  | 14              | 43.7         | +2              | 6            |
| W            | 97  | $\tau$ Leonis | 5.2  | 11              | 25.4         | +3              | 8            |

| $\varphi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |       |   |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|---------------------------------|------------|-------|---|
|           | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                      | $\Delta A$ | E     | W |
| +0        | 13           | 4.3          | 25           | 33           | 265          | 9            | 97           | 18           | -75 | -      | 17     | +                               | -1.1       | +21.0 | - |
| 1         |              | 4.4          | 25           | 27           | 267          | 15           | 95           | 12           | -75 | -      | 10     | +                               | -0.7       | +21.0 | - |
| 2         |              | 4.5          | 25           | 24           | 269          | 21           | 93           | 7            | -75 | -      | 3      | +                               | -0.3       | +21.0 | - |
| 3         |              | 4.6          | 25           | 23           | 271          | 27           | 91           | 1            | -75 | +      | 5      | -                               | 0.0        | +21.0 | - |
| 4         |              | 4.7          | 25           | 25           | 273          | 33           | 88           | 55           | -75 | +      | 12     | -                               | +0.4       | +21.0 | - |
| 5         |              | 4.8          | 25           | 28           | 275          | 39           | 86           | 49           | -75 | +      | 20     | -                               | +0.8       | +20.9 | - |
| 6         |              | 4.9          | 25           | 34           | 277          | 44           | 84           | 44           | -74 | +      | 27     | -                               | +1.1       | +20.8 | - |
| 7         |              | 4.9          | 25           | 42           | 279          | 48           | 82           | 40           | -74 | +      | 34     | -                               | +1.5       | +20.5 | - |
| 8         |              | 5.0          | 25           | 52           | 281          | 50           | 80           | 38           | -73 | +      | 40     | -                               | +1.8       | +20.3 | - |
| 9         |              | 5.1          | 26           | 4            | 283          | 51           | 78           | 38           | -72 | +      | 47     | -                               | +2.2       | +20.0 | - |
| 10        |              | 5.2          | 26           | 18           | 285          | 50           | 76           | 39           | -71 | +      | 53     | -                               | +2.5       | +19.6 | - |
| 11        |              | 5.3          | 26           | 34           | 287          | 47           | 74           | 43           | -70 | +      | 58     | -                               | +2.9       | +19.2 | - |
| 12        |              | 5.4          | 26           | 52           | 289          | 40           | 72           | 50           | -69 | +      | 64     | -                               | +3.2       | +18.7 | - |
| 13        |              | 5.5          | 27           | 12           | 291          | 31           | 71           | 0            | -68 | +      | 69     | -                               | +3.5       | +18.3 | - |
| 14        |              | 5.6          | 27           | 34           | 293          | 20           | 69           | 12           | -67 | +      | 73     | -                               | +3.8       | +17.9 | - |
| 15        |              | 5.7          | 27           | 57           | 295          | 6            | 67           | 27           | -66 | +      | 77     | -                               | +4.1       | +17.4 | - |
| 16        |              | 5.8          | 28           | 22           | 296          | 48           | 65           | 45           | -65 | +      | 81     | -                               | +4.3       | +16.8 | - |
| 17        |              | 5.9          | 28           | 49           | 298          | 28           | 64           | 7            | -63 | +      | 84     | -                               | +4.6       | +16.3 | - |
| 18        |              | 5.9          | 29           | 17           | 300          | 3            | 62           | 32           | -62 | +      | 87     | -                               | +4.8       | +15.7 | - |
| 19        |              | 6.0          | 29           | 46           | 301          | 36           | 61           | 0            | -61 | +      | 90     | -                               | +5.1       | +15.1 | - |
| +20       | 13           | 6.1          | 30           | 17           | 303          | 5            | 59           | 32           | -59 | +      | 92     | -                               | +5.3       | +14.5 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| +0        | +0.05      | 0.0        | +0.6         | -0.8         |
| 5         | 0.05       | 0.0        | 0.6          | 0.8          |
| 10        | 0.05       | +0.1       | 0.6          | 0.7          |
| 15        | 0.05       | 0.1        | 0.5          | 0.7          |
| +20       | +0.05      | +0.2       | +0.4         | -0.6         |

| Pair No. 112 | No. | Star              | Mag. | $\alpha_{1950}$ |              | $\delta_{1950}$ |              |
|--------------|-----|-------------------|------|-----------------|--------------|-----------------|--------------|
|              |     |                   |      | <sup>h</sup>    | <sup>m</sup> | <sup>°</sup>    | <sup>'</sup> |
| E            | 142 | $\alpha$ Ophiuchi | 2.1  | 17              | 32.6         | +12             | 36           |
| W            | 79  | $\alpha$ Cancri   | 4.3  | 8               | 55.8         | +12             | 3            |

| $\varphi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |     |   |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|---------------------------------|------------|-----|---|
|           | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                      | $\Delta A$ | E   | W |
| +0        | 13           | 14.3         | 65           | 51           | 256          | 10           | 103          | 14           | -73 | -      | 8      | +                               | -2.3       | +44 | - |
| 1         |              | 14.3         | 65           | 37           | 256          | 37           | 102          | 47           | -73 | -      | 7      | +                               | -2.3       | +44 | - |
| 2         |              | 14.3         | 65           | 23           | 257          | 3            | 102          | 21           | -73 | -      | 5      | +                               | -2.2       | +45 | - |
| 3         |              | 14.2         | 65           | 10           | 257          | 30           | 101          | 54           | -73 | -      | 4      | +                               | -2.1       | +45 | - |
| 4         |              | 14.2         | 64           | 58           | 257          | 58           | 101          | 26           | -73 | -      | 2      | +                               | -2.0       | +46 | - |
| 5         |              | 14.2         | 64           | 46           | 258          | 25           | 100          | 59           | -73 | -      | 1      | +                               | -2.0       | +46 | - |
| 6         |              | 14.2         | 64           | 35           | 258          | 53           | 100          | 31           | -73 | +      | 1      | -                               | -1.9       | +47 | - |
| 7         |              | 14.2         | 64           | 24           | 259          | 21           | 100          | 3            | -73 | +      | 3      | -                               | -1.8       | +47 | - |
| 8         |              | 14.1         | 64           | 13           | 259          | 49           | 99           | 34           | -73 | +      | 4      | -                               | -1.7       | +48 | - |
| 9         |              | 14.1         | 64           | 3            | 260          | 18           | 99           | 6            | -73 | +      | 6      | -                               | -1.7       | +48 | - |
| 10        |              | 14.1         | 63           | 53           | 260          | 47           | 98           | 37           | -73 | +      | 7      | -                               | -1.6       | +48 | - |
| 11        |              | 14.1         | 63           | 44           | 261          | 16           | 98           | 7            | -73 | +      | 9      | -                               | -1.5       | +49 | - |
| 12        |              | 14.0         | 63           | 36           | 261          | 45           | 97           | 38           | -73 | +      | 11     | -                               | -1.4       | +49 | - |
| 13        |              | 14.0         | 63           | 28           | 262          | 15           | 97           | 8            | -73 | +      | 12     | -                               | -1.3       | +49 | - |
| 14        |              | 14.0         | 63           | 20           | 262          | 45           | 96           | 38           | -72 | +      | 14     | -                               | -1.2       | +50 | - |
| 15        |              | 14.0         | 63           | 13           | 263          | 15           | 96           | 8            | -72 | +      | 15     | -                               | -1.1       | +50 | - |
| 16        |              | 14.0         | 63           | 7            | 263          | 45           | 95           | 38           | -72 | +      | 17     | -                               | -1.0       | +50 | - |
| 17        |              | 13.9         | 63           | 1            | 264          | 15           | 95           | 7            | -71 | +      | 18     | -                               | -1.0       | +51 | - |
| 18        |              | 13.9         | 62           | 55           | 264          | 45           | 94           | 37           | -71 | +      | 20     | -                               | -0.9       | +51 | - |
| 19        |              | 13.9         | 62           | 50           | 265          | 16           | 94           | 6            | -71 | +      | 22     | -                               | -0.8       | +51 | - |
| +20       | 13           | 13.9         | 62           | 46           | 265          | 46           | 93           | 35           | -70 | +      | 23     | -                               | -0.7       | +51 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| +0        | +0.05      | -0.1       | 0.0          | -0.3         |
| 5         | 0.05       | 0.1        | 0.0          | 0.3          |
| 10        | 0.05       | -0.1       | +0.1         | 0.3          |
| 15        | 0.05       | 0.0        | 0.1          | 0.3          |
| +20       | +0.05      | 0.0        | +0.1         | -0.3         |



TABLE II.

|                | No. | Star              | Mag. | $\alpha_{1950}$ | $\delta_{1950}$ |
|----------------|-----|-------------------|------|-----------------|-----------------|
| Pair No. 113 E | 138 | $\kappa$ Ophiuchi | 3.4  | 16 55.3         | + 9 27          |
| W              | 83  | $\omicron$ Leonis | 3.8  | 9 38.5          | +10 7           |

| $\phi$ | S  |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |      |            |     |   |
|--------|----|------|----|----|-------|----|-------|----|-----|--------|--------|------------------------------|------|------------|-----|---|
|        | h  | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                   | E    | $\Delta A$ | W   |   |
| + 0    | 13 | 16.7 | 55 | 48 | 258   | 33 | 102   | 16 | -73 | -      | 11     | +                            | -2.1 | +          | 6.7 | - |
| 1      |    | 16.8 | 55 | 36 | 259   | 13 | 101   | 36 | -74 | -      | 9      | +                            | -1.9 | +          | 6.7 | - |
| 2      |    | 16.8 | 55 | 25 | 259   | 54 | 100   | 55 | -74 | -      | 7      | +                            | -1.8 | +          | 6.8 | - |
| 3      |    | 16.8 | 55 | 14 | 260   | 35 | 100   | 15 | -74 | -      | 5      | +                            | -1.7 | +          | 6.8 | - |
| 4      |    | 16.8 | 55 | 5  | 261   | 16 | 99    | 33 | -74 | -      | 3      | +                            | -1.6 | +          | 6.9 | - |
| 5      |    | 16.9 | 54 | 55 | 261   | 58 | 98    | 52 | -74 | -      | 1      | +                            | -1.5 | +          | 7.0 | - |
| 6      |    | 16.9 | 54 | 47 | 262   | 39 | 98    | 10 | -74 | +      | 1      | -                            | -1.4 | +          | 7.0 | - |
| 7      |    | 16.9 | 54 | 39 | 263   | 22 | 97    | 28 | -74 | +      | 3      | -                            | -1.2 | +          | 7.0 | - |
| 8      |    | 17.0 | 54 | 32 | 264   | 4  | 96    | 46 | -74 | +      | 4      | -                            | -1.1 | +          | 7.1 | - |
| 9      |    | 17.0 | 54 | 26 | 264   | 47 | 96    | 3  | -74 | +      | 6      | -                            | -1.0 | +          | 7.1 | - |
| 10     |    | 17.0 | 54 | 20 | 265   | 29 | 95    | 21 | -74 | +      | 8      | -                            | -0.9 | +          | 7.2 | - |
| 11     |    | 17.1 | 54 | 16 | 266   | 13 | 94    | 38 | -73 | +      | 10     | -                            | -0.7 | +          | 7.2 | - |
| 12     |    | 17.1 | 54 | 12 | 266   | 56 | 93    | 55 | -73 | +      | 12     | -                            | -0.6 | +          | 7.2 | - |
| 13     |    | 17.1 | 54 | 8  | 267   | 39 | 93    | 12 | -73 | +      | 14     | -                            | -0.5 | +          | 7.2 | - |
| 14     |    | 17.1 | 54 | 6  | 268   | 22 | 92    | 28 | -73 | +      | 16     | -                            | -0.4 | +          | 7.3 | - |
| 15     |    | 17.2 | 54 | 4  | 269   | 6  | 91    | 45 | -72 | +      | 18     | -                            | -0.2 | +          | 7.3 | - |
| 16     |    | 17.2 | 54 | 3  | 269   | 50 | 91    | 2  | -72 | +      | 20     | -                            | -0.1 | +          | 7.3 | - |
| 17     |    | 17.2 | 54 | 3  | 270   | 33 | 90    | 18 | -72 | +      | 22     | -                            | 0.0  | +          | 7.3 | - |
| 18     |    | 17.3 | 54 | 3  | 271   | 17 | 89    | 35 | -71 | +      | 24     | -                            | +0.2 | +          | 7.3 | - |
| 19     |    | 17.3 | 54 | 5  | 272   | 1  | 88    | 52 | -71 | +      | 26     | -                            | +0.3 | +          | 7.3 | - |
| +20    | 13 | 17.3 | 54 | 7  | 272   | 44 | 88    | 8  | -70 | +      | 28     | -                            | +0.4 | +          | 7.3 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| 0      | m          | '          | '            | '            |
| + 0    | +0.05      | -0.1       | +0.1         | -0.3         |
| 5      | 0.05       | -0.1       | 0.1          | 0.3          |
| 10     | 0.05       | 0.0        | 0.1          | 0.3          |
| 15     | 0.05       | 0.0        | 0.1          | 0.3          |
| +20    | +0.05      | 0.0        | +0.1         | -0.4         |

|                | No. | Star              | Mag. | $\alpha_{1950}$ | $\delta_{1950}$ |
|----------------|-----|-------------------|------|-----------------|-----------------|
| Pair No. 114 E | 146 | $\gamma$ Ophiuchi | 3.7  | 17 45.4         | +2 43           |
| W              | 80  | $\theta$ Hydræ    | 3.8  | 9 11.8          | +2 32           |

| $\phi$ | S  |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |      |            |     |   |
|--------|----|------|----|----|-------|----|-------|----|-----|--------|--------|------------------------------|------|------------|-----|---|
|        | h  | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                   | E    | $\Delta A$ | W   |   |
| + 0    | 13 | 28.6 | 64 | 51 | 266   | 59 | 92    | 48 | -75 | -      | 2      | +                            | -0.5 | +          | 4.7 | - |
| 1      |    | 28.6 | 64 | 49 | 267   | 28 | 92    | 19 | -75 | 0      | -      | -                            | -0.4 | +          | 4.7 | - |
| 2      |    | 28.6 | 64 | 46 | 267   | 56 | 91    | 51 | -75 | +      | 2      | -                            | -0.3 | +          | 4.7 | - |
| 3      |    | 28.6 | 64 | 45 | 268   | 24 | 91    | 23 | -75 | +      | 3      | -                            | -0.3 | +          | 4.7 | - |
| 4      |    | 28.6 | 64 | 43 | 268   | 52 | 90    | 55 | -75 | +      | 5      | -                            | -0.2 | +          | 4.7 | - |
| 5      |    | 28.5 | 64 | 42 | 269   | 21 | 90    | 26 | -75 | +      | 6      | -                            | -0.1 | +          | 4.7 | - |
| 6      |    | 28.5 | 64 | 42 | 269   | 49 | 89    | 58 | -75 | +      | 8      | -                            | 0.0  | +          | 4.7 | - |
| 7      |    | 28.5 | 64 | 42 | 270   | 17 | 89    | 29 | -75 | +      | 10     | -                            | +0.1 | +          | 4.7 | - |
| 8      |    | 28.5 | 64 | 43 | 270   | 46 | 89    | 1  | -74 | +      | 11     | -                            | +0.2 | +          | 4.7 | - |
| 9      |    | 28.5 | 64 | 44 | 271   | 14 | 88    | 33 | -74 | +      | 13     | -                            | +0.2 | +          | 4.7 | - |
| 10     |    | 28.5 | 64 | 46 | 271   | 42 | 88    | 4  | -74 | +      | 14     | -                            | +0.3 | +          | 4.7 | - |
| 11     |    | 28.5 | 64 | 48 | 272   | 11 | 87    | 36 | -74 | +      | 16     | -                            | +0.4 | +          | 4.7 | - |
| 12     |    | 28.5 | 64 | 50 | 272   | 39 | 87    | 8  | -73 | +      | 17     | -                            | +0.5 | +          | 4.7 | - |
| 13     |    | 28.5 | 64 | 54 | 273   | 7  | 86    | 40 | -73 | +      | 19     | -                            | +0.6 | +          | 4.7 | - |
| 14     |    | 28.5 | 64 | 57 | 273   | 35 | 86    | 12 | -73 | +      | 21     | -                            | +0.6 | +          | 4.7 | - |
| 15     |    | 28.5 | 65 | 1  | 274   | 3  | 85    | 44 | -72 | +      | 22     | -                            | +0.7 | +          | 4.6 | - |
| 16     |    | 28.5 | 65 | 6  | 274   | 31 | 85    | 16 | -72 | +      | 24     | -                            | +0.8 | +          | 4.6 | - |
| 17     |    | 28.4 | 65 | 11 | 274   | 58 | 84    | 48 | -71 | +      | 25     | -                            | +0.9 | +          | 4.6 | - |
| 18     |    | 28.4 | 65 | 17 | 275   | 26 | 84    | 21 | -71 | +      | 27     | -                            | +1.0 | +          | 4.6 | - |
| 19     |    | 28.4 | 65 | 23 | 275   | 53 | 83    | 53 | -71 | +      | 28     | -                            | +1.1 | +          | 4.6 | - |
| +20    | 13 | 28.4 | 65 | 29 | 276   | 20 | 83    | 26 | -70 | +      | 29     | -                            | +1.1 | +          | 4.5 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| 0      | m          | '          | '            | '            |
| + 0    | +0.05      | 0.0        | 0.0          | -0.3         |
| 5      | 0.05       | 0.0        | 0.0          | 0.3          |
| 10     | 0.05       | 0.0        | 0.0          | 0.3          |
| 15     | 0.05       | 0.0        | 0.0          | 0.3          |
| +20    | +0.05      | 0.0        | 0.0          | -0.3         |



TABLE II.

Pair No. 115  
 E 181  $\gamma$  Serpentis 3.9 15<sup>h</sup> 54.1<sup>m</sup> +15<sup>o</sup> 49'  
 W 94  $\theta$  Leonis 3.4 11 11.6 +15 42

| $\phi$ | S  |      | z  |    | A <sub>E</sub> |    | A <sub>W</sub> |    | dz  | dA <sub>E</sub> | dA <sub>W</sub> | Var. for $\Delta\phi = +10'$ |                 |   |
|--------|----|------|----|----|----------------|----|----------------|----|-----|-----------------|-----------------|------------------------------|-----------------|---|
|        | h  | m    | o  | '  | o              | '  | o              | '  |     |                 |                 | $\Delta z$                   | $\Delta A$<br>E | W |
| +0     | 13 | 33.0 | 38 | 49 | 244            | 13 | 115            | 34 | -67 | - 42 +          | - 43 +          | -4.3                         | + 11.2          | - |
| 1      |    | 33.0 | 38 | 23 | 245            | 21 | 114            | 26 | -68 | - 39 +          | - 42 +          | -4.2                         | + 11.5          | - |
| 2      |    | 33.0 | 37 | 59 | 246            | 31 | 113            | 17 | -69 | - 37 +          | - 40 +          | -4.0                         | + 11.7          | - |
| 3      |    | 33.0 | 37 | 36 | 247            | 42 | 112            | 6  | -69 | - 34 +          | - 38 +          | -3.8                         | + 12.0          | - |
| 4      |    | 33.0 | 37 | 14 | 248            | 55 | 110            | 53 | -70 | - 31 +          | - 36 +          | -3.6                         | + 12.3          | - |
| 5      |    | 32.9 | 36 | 53 | 250            | 10 | 109            | 38 | -70 | - 28 +          | - 34 +          | -3.4                         | + 12.6          | - |
| 6      |    | 32.9 | 36 | 33 | 251            | 26 | 108            | 22 | -71 | - 25 +          | - 32 +          | -3.2                         | + 12.8          | - |
| 7      |    | 32.9 | 36 | 15 | 252            | 43 | 107            | 4  | -71 | - 22 +          | - 30 +          | -3.0                         | + 13.0          | - |
| 8      |    | 32.9 | 35 | 58 | 254            | 2  | 105            | 46 | -71 | - 18 +          | - 27 +          | -2.7                         | + 13.2          | - |
| 9      |    | 32.9 | 35 | 42 | 255            | 22 | 104            | 25 | -72 | - 15 +          | - 25 +          | -2.5                         | + 13.5          | - |
| 10     |    | 32.9 | 35 | 28 | 256            | 43 | 103            | 4  | -72 | - 11 +          | - 23 +          | -2.3                         | + 13.7          | - |
| 11     |    | 32.9 | 35 | 15 | 258            | 6  | 101            | 41 | -72 | - 8 +           | - 20 +          | -2.0                         | + 13.9          | - |
| 12     |    | 32.9 | 35 | 3  | 259            | 30 | 100            | 18 | -72 | - 4 +           | - 18 +          | -1.8                         | + 14.0          | - |
| 13     |    | 32.9 | 34 | 53 | 260            | 54 | 98             | 53 | -72 | 0               | - 1.6 +         | -1.6                         | + 14.1          | - |
| 14     |    | 32.9 | 34 | 44 | 262            | 19 | 97             | 28 | -72 | + 4 -           | - 1.3 +         | -1.3                         | + 14.3          | - |
| 15     |    | 32.9 | 34 | 37 | 263            | 45 | 96             | 2  | -72 | + 8 -           | - 1.1 +         | -1.1                         | + 14.4          | - |
| 16     |    | 32.9 | 34 | 32 | 265            | 12 | 94             | 35 | -72 | + 12 -          | - 0.8 +         | -0.8                         | + 14.5          | - |
| 17     |    | 32.9 | 34 | 27 | 266            | 39 | 93             | 8  | -72 | + 16 -          | - 0.6 +         | -0.6                         | + 14.5          | - |
| 18     |    | 32.9 | 34 | 25 | 268            | 6  | 91             | 41 | -71 | + 20 -          | - 0.3 +         | -0.3                         | + 14.6          | - |
| 19     |    | 32.8 | 34 | 24 | 269            | 34 | 90             | 13 | -71 | + 24 -          | - 0.1 +         | -0.1                         | + 14.6          | - |
| +20    | 13 | 32.8 | 34 | 24 | 271            | 1  | 88             | 45 | -70 | + 28 -          | + 0.2 +         | + 0.2                        | + 14.7          | - |

Annual Precessions of S, z, A<sub>E</sub>, and A<sub>W</sub>.

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| +0     | +0.05      | -0.1       | +0.2         | -0.5         |
| 5      | 0.05       | 0.1        | 0.3          | 0.5          |
| 10     | 0.05       | -0.1       | 0.3          | 0.6          |
| 15     | 0.05       | 0.0        | 0.3          | 0.6          |
| +20    | +0.05      | 0.0        | +0.3         | -0.6         |

Pair No. 116  
 E 188  $\kappa$  Ophiuchi 3.4 16<sup>h</sup> 55.3<sup>m</sup> +9<sup>o</sup> 27'  
 W 89  $\rho$  Leonis 3.9 10 30.2 +9 34

| $\phi$ | S  |      | z  |    | A <sub>E</sub> |    | A <sub>W</sub> |    | dz  | dA <sub>E</sub> | dA <sub>W</sub> | Var. for $\Delta\phi = +10'$ |                 |   |
|--------|----|------|----|----|----------------|----|----------------|----|-----|-----------------|-----------------|------------------------------|-----------------|---|
|        | h  | m    | o  | '  | o              | '  | o              | '  |     |                 |                 | $\Delta z$                   | $\Delta A$<br>E | W |
| +0     | 13 | 42.7 | 49 | 27 | 257            | 31 | 102            | 38 | -73 | - 14 +          | - 2.2 +         | -2.2                         | + 8.4           | - |
| 1      |    | 42.7 | 49 | 15 | 258            | 22 | 101            | 48 | -74 | - 12 +          | - 2.0 +         | -2.0                         | + 8.4           | - |
| 2      |    | 42.7 | 49 | 3  | 259            | 13 | 100            | 57 | -74 | - 10 +          | - 1.9 +         | -1.9                         | + 8.5           | - |
| 3      |    | 42.7 | 48 | 52 | 260            | 4  | 100            | 5  | -74 | - 8 +           | - 1.7 +         | -1.7                         | + 8.6           | - |
| 4      |    | 42.7 | 48 | 42 | 260            | 56 | 99             | 14 | -74 | - 6 +           | - 1.6 +         | -1.6                         | + 8.7           | - |
| 5      |    | 42.7 | 48 | 33 | 261            | 48 | 98             | 21 | -74 | - 3 +           | - 1.4 +         | -1.4                         | + 8.8           | - |
| 6      |    | 42.7 | 48 | 25 | 262            | 41 | 97             | 29 | -74 | - 1 +           | - 1.3 +         | -1.3                         | + 8.8           | - |
| 7      |    | 42.8 | 48 | 17 | 263            | 34 | 96             | 36 | -74 | + 1 -           | - 1.1 +         | -1.1                         | + 8.9           | - |
| 8      |    | 42.8 | 48 | 11 | 264            | 27 | 95             | 42 | -74 | + 4 -           | - 1.0 +         | -1.0                         | + 8.9           | - |
| 9      |    | 42.8 | 48 | 6  | 265            | 21 | 94             | 49 | -74 | + 6 -           | - 0.8 +         | -0.8                         | + 9.0           | - |
| 10     |    | 42.8 | 48 | 1  | 266            | 14 | 93             | 55 | -74 | + 8 -           | - 0.7 +         | -0.7                         | + 9.0           | - |
| 11     |    | 42.8 | 47 | 58 | 267            | 8  | 93             | 1  | -73 | + 11 -          | - 0.5 +         | -0.5                         | + 9.0           | - |
| 12     |    | 42.8 | 47 | 55 | 268            | 2  | 92             | 7  | -73 | + 13 -          | - 0.4 +         | -0.4                         | + 9.0           | - |
| 13     |    | 42.8 | 47 | 53 | 268            | 57 | 91             | 13 | -73 | + 16 -          | - 0.2 +         | -0.2                         | + 9.0           | - |
| 14     |    | 42.8 | 47 | 53 | 269            | 51 | 90             | 19 | -73 | + 18 -          | 0.0 +           | 0.0                          | + 9.0           | - |
| 15     |    | 42.8 | 47 | 53 | 270            | 45 | 89             | 25 | -72 | + 20 -          | + 0.1 +         | + 0.1                        | + 9.1           | - |
| 16     |    | 42.8 | 47 | 54 | 271            | 39 | 88             | 30 | -72 | + 23 -          | + 0.3 +         | + 0.3                        | + 9.0           | - |
| 17     |    | 42.8 | 47 | 56 | 272            | 33 | 87             | 36 | -72 | + 25 -          | + 0.4 +         | + 0.4                        | + 9.0           | - |
| 18     |    | 42.8 | 47 | 59 | 273            | 27 | 86             | 42 | -71 | + 27 -          | + 0.6 +         | + 0.6                        | + 9.0           | - |
| 19     |    | 42.8 | 48 | 3  | 274            | 21 | 85             | 49 | -71 | + 30 -          | + 0.7 +         | + 0.7                        | + 9.0           | - |
| +20    | 13 | 42.8 | 48 | 8  | 275            | 15 | 84             | 55 | -70 | + 32 -          | + 0.8 +         | + 0.8                        | + 8.9           | - |

Annual Precessions of S, z, A<sub>E</sub>, and A<sub>W</sub>.

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| +0     | +0.05      | -0.1       | +0.1         | -0.4         |
| 5      | 0.05       | 0.0        | 0.1          | 0.4          |
| 10     | 0.05       | 0.0        | 0.1          | 0.4          |
| 15     | 0.05       | 0.0        | 0.1          | 0.4          |
| +20    | +0.05      | 0.0        | +0.1         | -0.4         |



Pair No. 117  
 E 142  $\alpha$  Ophiuchi 2.1 17 32.6 +12 36  
 W 87  $\alpha$  Leonis 1.3 10 5.7 +12 13

| $\varphi$ | S  |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |      |   |     |   |
|-----------|----|------|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------|---|-----|---|
|           | h  | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | E    | W |     |   |
| +0        | 13 | 49.3 | 57 | 22 | 255   | 0  | 104   | 33 | -72 | -      | 13     | +                               | -2.6 | + | 6.2 | - |
| 1         |    | 49.3 | 57 | 7  | 255   | 37 | 103   | 55 | -73 | -      | 11     | +                               | -2.5 | + | 6.3 | - |
| 2         |    | 49.2 | 56 | 53 | 256   | 15 | 103   | 17 | -73 | -      | 9      | +                               | -2.3 | + | 6.3 | - |
| 3         |    | 49.2 | 56 | 39 | 256   | 53 | 102   | 39 | -73 | -      | 7      | +                               | -2.2 | + | 6.4 | - |
| 4         |    | 49.2 | 56 | 26 | 257   | 32 | 102   | 0  | -73 | -      | 5      | +                               | -2.1 | + | 6.5 | - |
| 5         |    | 49.2 | 56 | 14 | 258   | 11 | 101   | 21 | -73 | -      | 4      | +                               | -2.0 | + | 6.6 | - |
| 6         |    | 49.2 | 56 | 2  | 258   | 50 | 100   | 42 | -73 | -      | 2      | +                               | -1.9 | + | 6.6 | - |
| 7         |    | 49.2 | 55 | 51 | 259   | 30 | 100   | 2  | -73 | -      | 0      | +                               | -1.8 | + | 6.7 | - |
| 8         |    | 49.1 | 55 | 41 | 260   | 10 | 99    | 22 | -73 | +      | 2      | -                               | -1.7 | + | 6.7 | - |
| 9         |    | 49.1 | 55 | 31 | 260   | 51 | 98    | 41 | -73 | +      | 4      | -                               | -1.6 | + | 6.8 | - |
| 10        |    | 49.1 | 55 | 22 | 261   | 32 | 98    | 0  | -73 | +      | 6      | -                               | -1.4 | + | 6.8 | - |
| 11        |    | 49.1 | 55 | 14 | 262   | 13 | 97    | 19 | -73 | +      | 8      | -                               | -1.3 | + | 6.9 | - |
| 12        |    | 49.1 | 55 | 6  | 262   | 54 | 96    | 38 | -73 | +      | 9      | -                               | -1.2 | + | 6.9 | - |
| 13        |    | 49.1 | 54 | 59 | 263   | 36 | 95    | 56 | -73 | +      | 11     | -                               | -1.1 | + | 7.0 | - |
| 14        |    | 49.0 | 54 | 53 | 264   | 18 | 95    | 14 | -72 | +      | 13     | -                               | -1.0 | + | 7.0 | - |
| 15        |    | 49.0 | 54 | 48 | 265   | 0  | 94    | 32 | -72 | +      | 15     | -                               | -0.8 | + | 7.0 | - |
| 16        |    | 49.0 | 54 | 43 | 265   | 42 | 93    | 49 | -72 | +      | 17     | -                               | -0.7 | + | 7.0 | - |
| 17        |    | 49.0 | 54 | 39 | 266   | 24 | 93    | 7  | -72 | +      | 19     | -                               | -0.6 | + | 7.1 | - |
| 18        |    | 49.0 | 54 | 36 | 267   | 7  | 92    | 24 | -71 | +      | 21     | -                               | -0.5 | + | 7.1 | - |
| 19        |    | 49.0 | 54 | 34 | 267   | 49 | 91    | 42 | -71 | +      | 23     | -                               | -0.3 | + | 7.1 | - |
| +20       | 13 | 48.9 | 54 | 32 | 268   | 32 | 90    | 59 | -70 | +      | 25     | -                               | -0.2 | + | 7.1 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| +0        | +0.05      | -0.1       | 0.0          | -0.3         |
| 5         | 0.05       | -0.1       | +0.1         | 0.4          |
| 10        | 0.05       | 0.0        | 0.1          | 0.4          |
| 15        | 0.05       | 0.0        | 0.1          | 0.4          |
| +20       | +0.05      | 0.0        | +0.1         | -0.4         |

Pair No. 118  
 E 143  $\xi$  Serpentis 3.6 17 34.7 -15 22  
 W 88  $\mu$  Hydræ 4.1 10 23.7 -16 35

| $\varphi$ | S  |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |      |   |     |   |
|-----------|----|------|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------|---|-----|---|
|           | h  | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | E    | W |     |   |
| +0        | 13 | 58.7 | 56 | 4  | 288   | 37 | 69    | 53 | -71 | +      | 17     | -                               | +3.3 | + | 6.3 | - |
| 1         |    | 58.6 | 56 | 24 | 289   | 15 | 69    | 15 | -70 | +      | 19     | -                               | +3.4 | + | 6.2 | - |
| 2         |    | 58.6 | 56 | 45 | 289   | 52 | 68    | 38 | -70 | +      | 21     | -                               | +3.5 | + | 6.1 | - |
| 3         |    | 58.5 | 57 | 7  | 290   | 28 | 68    | 1  | -70 | +      | 22     | -                               | +3.6 | + | 6.0 | - |
| 4         |    | 58.5 | 57 | 29 | 291   | 4  | 67    | 26 | -69 | +      | 24     | -                               | +3.7 | + | 5.9 | - |
| 5         |    | 58.4 | 57 | 51 | 291   | 39 | 66    | 50 | -69 | +      | 25     | -                               | +3.8 | + | 5.8 | - |
| 6         |    | 58.4 | 58 | 14 | 292   | 14 | 66    | 16 | -69 | +      | 27     | -                               | +3.9 | + | 5.7 | - |
| 7         |    | 58.3 | 58 | 38 | 292   | 48 | 65    | 42 | -68 | +      | 28     | -                               | +4.0 | + | 5.6 | - |
| 8         |    | 58.3 | 59 | 2  | 293   | 21 | 65    | 9  | -68 | +      | 29     | -                               | +4.1 | + | 5.5 | - |
| 9         |    | 58.2 | 59 | 27 | 293   | 53 | 64    | 36 | -67 | +      | 31     | -                               | +4.2 | + | 5.4 | - |
| 10        |    | 58.2 | 59 | 52 | 294   | 25 | 64    | 4  | -67 | +      | 32     | -                               | +4.3 | + | 5.2 | - |
| 11        |    | 58.1 | 60 | 18 | 294   | 56 | 63    | 33 | -66 | +      | 33     | -                               | +4.3 | + | 5.1 | - |
| 12        |    | 58.1 | 60 | 44 | 295   | 26 | 63    | 2  | -66 | +      | 34     | -                               | +4.4 | + | 5.0 | - |
| 13        |    | 58.0 | 61 | 11 | 295   | 56 | 62    | 32 | -65 | +      | 35     | -                               | +4.5 | + | 4.9 | - |
| 14        |    | 57.9 | 61 | 38 | 296   | 25 | 62    | 2  | -65 | +      | 37     | -                               | +4.6 | + | 4.8 | - |
| 15        |    | 57.9 | 62 | 6  | 296   | 53 | 61    | 34 | -64 | +      | 38     | -                               | +4.6 | + | 4.7 | - |
| 16        |    | 57.8 | 62 | 34 | 297   | 21 | 61    | 6  | -63 | +      | 39     | -                               | +4.7 | + | 4.5 | - |
| 17        |    | 57.8 | 63 | 3  | 297   | 48 | 60    | 38 | -63 | +      | 40     | -                               | +4.8 | + | 4.4 | - |
| 18        |    | 57.7 | 63 | 31 | 298   | 14 | 60    | 12 | -62 | +      | 41     | -                               | +4.9 | + | 4.3 | - |
| 19        |    | 57.7 | 64 | 1  | 298   | 39 | 59    | 45 | -62 | +      | 42     | -                               | +4.9 | + | 4.2 | - |
| +20       | 13 | 57.6 | 64 | 30 | 299   | 4  | 59    | 20 | -61 | +      | 43     | -                               | +5.0 | + | 4.1 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| +0        | +0.05      | +0.1       | 0.0          | -0.4         |
| 5         | 0.05       | 0.1        | 0.0          | 0.3          |
| 10        | 0.05       | 0.1        | 0.0          | 0.3          |
| 15        | 0.05       | 0.1        | 0.0          | 0.3          |
| +20       | +0.05      | +0.2       | -0.1         | -0.3         |



TABLE II.

|              | No.   | Star               | Mag. | $\alpha_{1950}$ | $\delta_{1950}$ |
|--------------|-------|--------------------|------|-----------------|-----------------|
| Pair No. 119 | E 136 | $\lambda$ Ophiuchi | 3.9  | 16 28.4         | +2 6            |
|              | W 99  | $\beta$ Virginis   | 3.8  | 11 48.1         | +2 3            |

| $\varphi$ | S  |     | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |       |   |
|-----------|----|-----|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------------|-------|---|
|           | h  | m   | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | $\Delta A$ | E     | W |
| +0        | 14 | 8.2 | 35 | 43 | 266   | 25 | 93    | 30 | -75 | -      | 7      | +                               | -0.6       | +13.9 | - |
| 1         |    | 8.2 | 35 | 40 | 267   | 49 | 92    | 7  | -75 | -      | 3      | +                               | -0.4       | +13.9 | - |
| 2         |    | 8.2 | 35 | 38 | 269   | 12 | 90    | 43 | -75 | +      | 1      | -                               | -0.1       | +13.9 | - |
| 3         |    | 8.2 | 35 | 38 | 270   | 36 | 89    | 20 | -75 | +      | 5      | -                               | +0.1       | +13.9 | - |
| 4         |    | 8.2 | 35 | 40 | 271   | 59 | 87    | 56 | -75 | +      | 9      | -                               | +0.4       | +13.9 | - |
| 5         |    | 8.2 | 35 | 43 | 273   | 23 | 86    | 33 | -75 | +      | 13     | -                               | +0.6       | +13.9 | - |
| 6         |    | 8.2 | 35 | 47 | 274   | 46 | 85    | 10 | -74 | +      | 17     | -                               | +0.8       | +13.8 | - |
| 7         |    | 8.2 | 35 | 53 | 276   | 8  | 83    | 47 | -74 | +      | 21     | -                               | +1.1       | +13.7 | - |
| 8         |    | 8.2 | 36 | 0  | 277   | 30 | 82    | 25 | -74 | +      | 25     | -                               | +1.3       | +13.6 | - |
| 9         |    | 8.2 | 36 | 8  | 278   | 52 | 81    | 3  | -73 | +      | 28     | -                               | +1.5       | +13.5 | - |
| 10        |    | 8.2 | 36 | 18 | 280   | 13 | 79    | 42 | -73 | +      | 32     | -                               | +1.8       | +13.4 | - |
| 11        |    | 8.2 | 36 | 30 | 281   | 33 | 78    | 22 | -72 | +      | 35     | -                               | +2.0       | +13.2 | - |
| 12        |    | 8.2 | 36 | 42 | 282   | 52 | 77    | 4  | -71 | +      | 39     | -                               | +2.2       | +13.1 | - |
| 13        |    | 8.2 | 36 | 56 | 284   | 9  | 75    | 46 | -71 | +      | 42     | -                               | +2.4       | +12.8 | - |
| 14        |    | 8.2 | 37 | 12 | 285   | 26 | 74    | 29 | -70 | +      | 45     | -                               | +2.7       | +12.7 | - |
| 15        |    | 8.2 | 37 | 28 | 286   | 42 | 73    | 13 | -69 | +      | 48     | -                               | +2.9       | +12.5 | - |
| 16        |    | 8.2 | 37 | 46 | 287   | 56 | 71    | 59 | -68 | +      | 51     | -                               | +3.1       | +12.3 | - |
| 17        |    | 8.2 | 38 | 5  | 289   | 9  | 70    | 46 | -68 | +      | 53     | -                               | +3.3       | +12.0 | - |
| 18        |    | 8.2 | 38 | 26 | 290   | 21 | 69    | 34 | -67 | +      | 56     | -                               | +3.5       | +11.8 | - |
| 19        |    | 8.2 | 38 | 47 | 291   | 31 | 68    | 24 | -66 | +      | 58     | -                               | +3.7       | +11.6 | - |
| +20       | 14 | 8.2 | 39 | 10 | 292   | 39 | 67    | 16 | -65 | +      | 60     | -                               | +3.9       | +11.3 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| +0        | +0.05      | 0.0        | +0.2         | -0.6         |
| 5         | 0.05       | 0.0        | 0.2          | 0.6          |
| 10        | 0.05       | +0.1       | 0.2          | 0.6          |
| 15        | 0.05       | 0.1        | 0.2          | 0.5          |
| +20       | +0.05      | +0.1       | +0.1         | -0.5         |

DATA REQUIRED FOR OBSERVATION.

|              | No.   | Star            | Mag. | $\alpha_{1950}$ | $\delta_{1950}$ |
|--------------|-------|-----------------|------|-----------------|-----------------|
| Pair No. 120 | E 143 | $\xi$ Serpentis | 3.6  | 17 34.7         | -15 22          |
|              | W 90  | $\nu$ Hydræ     | 3.3  | 10 47.2         | -15 56          |

| $\varphi$ | S  |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |      |   |
|-----------|----|------|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------------|------|---|
|           | h  | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | $\Delta A$ | E    | W |
| +0        | 14 | 10.7 | 53 | 14 | 289   | 19 | 69    | 58 | -71 | +      | 19     | -                               | +3.4       | +7.0 | - |
| 1         |    | 10.7 | 53 | 35 | 290   | 1  | 69    | 16 | -70 | +      | 21     | -                               | +3.5       | +6.9 | - |
| 2         |    | 10.6 | 53 | 56 | 290   | 42 | 68    | 35 | -70 | +      | 23     | -                               | +3.6       | +6.8 | - |
| 3         |    | 10.6 | 54 | 18 | 291   | 22 | 67    | 54 | -70 | +      | 25     | -                               | +3.7       | +6.7 | - |
| 4         |    | 10.6 | 54 | 41 | 292   | 2  | 67    | 15 | -69 | +      | 26     | -                               | +3.8       | +6.6 | - |
| 5         |    | 10.6 | 55 | 4  | 292   | 41 | 66    | 36 | -69 | +      | 28     | -                               | +3.9       | +6.4 | - |
| 6         |    | 10.5 | 55 | 28 | 293   | 19 | 65    | 57 | -68 | +      | 29     | -                               | +4.0       | +6.4 | - |
| 7         |    | 10.5 | 55 | 52 | 293   | 56 | 65    | 20 | -68 | +      | 31     | -                               | +4.1       | +6.2 | - |
| 8         |    | 10.5 | 56 | 17 | 294   | 33 | 64    | 43 | -67 | +      | 32     | -                               | +4.2       | +6.1 | - |
| 9         |    | 10.5 | 56 | 42 | 295   | 9  | 64    | 7  | -67 | +      | 33     | -                               | +4.3       | +5.9 | - |
| 10        |    | 10.4 | 57 | 8  | 295   | 44 | 63    | 32 | -66 | +      | 35     | -                               | +4.4       | +5.8 | - |
| 11        |    | 10.4 | 57 | 35 | 296   | 18 | 62    | 57 | -66 | +      | 36     | -                               | +4.5       | +5.7 | - |
| 12        |    | 10.4 | 58 | 2  | 296   | 52 | 62    | 24 | -65 | +      | 37     | -                               | +4.6       | +5.5 | - |
| 13        |    | 10.4 | 58 | 30 | 297   | 25 | 61    | 51 | -64 | +      | 38     | -                               | +4.7       | +5.4 | - |
| 14        |    | 10.3 | 58 | 58 | 297   | 57 | 61    | 18 | -64 | +      | 40     | -                               | +4.8       | +5.3 | - |
| 15        |    | 10.3 | 59 | 27 | 298   | 28 | 60    | 47 | -63 | +      | 41     | -                               | +4.8       | +5.2 | - |
| 16        |    | 10.3 | 59 | 56 | 298   | 59 | 60    | 16 | -63 | +      | 42     | -                               | +4.9       | +5.0 | - |
| 17        |    | 10.2 | 60 | 26 | 299   | 28 | 59    | 46 | -62 | +      | 43     | -                               | +5.0       | +4.9 | - |
| 18        |    | 10.2 | 60 | 56 | 299   | 57 | 59    | 17 | -61 | +      | 44     | -                               | +5.1       | +4.8 | - |
| 19        |    | 10.2 | 61 | 26 | 300   | 26 | 58    | 48 | -61 | +      | 45     | -                               | +5.1       | +4.7 | - |
| +20       | 14 | 10.2 | 61 | 57 | 300   | 53 | 58    | 21 | -60 | +      | 46     | -                               | +5.2       | +4.5 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| +0        | +0.05      | +0.1       | 0.0          | -0.4         |
| 5         | 0.05       | 0.1        | 0.0          | 0.4          |
| 10        | 0.05       | 0.1        | 0.0          | 0.4          |
| 15        | 0.05       | 0.1        | 0.0          | 0.3          |
| +20       | +0.05      | +0.2       | -0.1         | -0.3         |



TABLE 11.

| Pair No. | E | No. | Star          | Mag. | $\alpha_{1950}$ |      | $\delta_{1950}$ |    |
|----------|---|-----|---------------|------|-----------------|------|-----------------|----|
|          |   |     |               |      | h               | m    | °               | '  |
| 121      | E | 150 | 72 Ophiuchi   | 3.7  | 18              | 5.0  | +9              | 33 |
|          | W | 89  | $\rho$ Leonis | 3.9  | 10              | 30.2 | +9              | 34 |

| $\varphi$ | S  |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |      |      |   |
|-----------|----|------|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------|------|---|
|           | h  | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | E    | W    |   |
| +0        | 14 | 17.6 | 57 | 59 | 258   | 43 | 101   | 18 | -74 | -      | 9      | +                               | -1.9 | +6.1 | - |
| 1         |    | 17.6 | 57 | 48 | 259   | 20 | 100   | 41 | -74 | -      | 8      | +                               | -1.9 | +6.2 | - |
| 2         |    | 17.6 | 57 | 37 | 259   | 57 | 100   | 4  | -74 | -      | 6      | +                               | -1.8 | +6.2 | - |
| 3         |    | 17.6 | 57 | 27 | 260   | 34 | 99    | 26 | -74 | -      | 4      | +                               | -1.6 | +6.3 | - |
| 4         |    | 17.6 | 57 | 17 | 261   | 12 | 98    | 48 | -74 | -      | 2      | +                               | -1.5 | +6.4 | - |
| 5         |    | 17.6 | 57 | 8  | 261   | 51 | 98    | 10 | -74 |        | 0      |                                 | -1.4 | +6.4 | - |
| 6         |    | 17.6 | 57 | 0  | 262   | 29 | 97    | 32 | -74 | +      | 1      | -                               | -1.3 | +6.4 | - |
| 7         |    | 17.6 | 56 | 53 | 263   | 8  | 96    | 53 | -74 | +      | 3      | -                               | -1.2 | +6.5 | - |
| 8         |    | 17.6 | 56 | 46 | 263   | 47 | 96    | 14 | -74 | +      | 5      | -                               | -1.1 | +6.5 | - |
| 9         |    | 17.6 | 56 | 40 | 264   | 26 | 95    | 35 | -74 | +      | 7      | -                               | -1.0 | +6.6 | - |
| 10        |    | 17.6 | 56 | 34 | 265   | 6  | 94    | 55 | -74 | +      | 9      | -                               | -0.9 | +6.6 | - |
| 11        |    | 17.6 | 56 | 29 | 265   | 45 | 94    | 16 | -73 | +      | 11     | -                               | -0.7 | +6.6 | - |
| 12        |    | 17.6 | 56 | 25 | 266   | 25 | 93    | 36 | -73 | +      | 13     | -                               | -0.6 | +6.6 | - |
| 13        |    | 17.6 | 56 | 22 | 267   | 5  | 92    | 56 | -73 | +      | 14     | -                               | -0.5 | +6.6 | - |
| 14        |    | 17.6 | 56 | 19 | 267   | 44 | 92    | 16 | -73 | +      | 16     | -                               | -0.4 | +6.7 | - |
| 15        |    | 17.6 | 56 | 17 | 268   | 24 | 91    | 36 | -72 | +      | 18     | -                               | -0.3 | +6.7 | - |
| 16        |    | 17.6 | 56 | 16 | 269   | 4  | 90    | 56 | -72 | +      | 20     | -                               | -0.2 | +6.7 | - |
| 17        |    | 17.6 | 56 | 15 | 269   | 45 | 90    | 16 | -72 | +      | 22     | -                               | -0.1 | +6.7 | - |
| 18        |    | 17.6 | 55 | 15 | 270   | 25 | 89    | 36 | -71 | +      | 24     | -                               | +0.1 | +6.7 | - |
| 19        |    | 17.6 | 56 | 16 | 271   | 5  | 88    | 56 | -71 | +      | 26     | -                               | +0.2 | +6.7 | - |
| +20       | 14 | 17.6 | 56 | 17 | 271   | 45 | 88    | 16 | -70 | +      | 27     | -                               | +0.3 | +6.7 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| +0        | m          | '          | '            | '            |
| 5         | +0.05      | -0.1       | 0.0          | -0.4         |
| 10        | 0.05       | 0.0        | 0.0          | 0.4          |
| 15        | 0.05       | 0.0        | 0.0          | 0.4          |
| +20       | +0.05      | 0.0        | 0.0          | -0.4         |

| Pair No. | E | No. | Star              | Mag. | $\alpha_{1950}$ |      | $\delta_{1950}$ |    |
|----------|---|-----|-------------------|------|-----------------|------|-----------------|----|
|          |   |     |                   |      | h               | m    | °               | '  |
| 122      | E | 143 | $\xi$ Serpentis   | 3.6  | 17              | 34.7 | -15             | 22 |
|          | W | 96  | $\delta$ Crateris | 3.8  | 11              | 16.8 | -14             | 30 |

| $\varphi$ | S  |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |      |      |   |
|-----------|----|------|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------|------|---|
|           | h  | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | E    | W    |   |
| +0        | 14 | 26.2 | 49 | 35 | 290   | 22 | 70    | 48 | -70 | +      | 22     | -                               | +3.4 | +8.0 | - |
| 1         |    | 26.2 | 49 | 56 | 291   | 10 | 70    | 0  | -70 | +      | 24     | -                               | +3.5 | +7.9 | - |
| 2         |    | 26.3 | 50 | 18 | 291   | 57 | 69    | 14 | -70 | +      | 26     | -                               | +3.6 | +7.7 | - |
| 3         |    | 26.3 | 50 | 40 | 292   | 43 | 68    | 28 | -69 | +      | 28     | -                               | +3.8 | +7.6 | - |
| 4         |    | 26.4 | 51 | 3  | 293   | 28 | 67    | 43 | -69 | +      | 30     | -                               | +3.9 | +7.5 | - |
| 5         |    | 26.4 | 51 | 26 | 294   | 12 | 66    | 58 | -68 | +      | 31     | -                               | +4.0 | +7.3 | - |
| 6         |    | 26.4 | 51 | 51 | 294   | 56 | 66    | 15 | -68 | +      | 33     | -                               | +4.1 | +7.2 | - |
| 7         |    | 26.5 | 52 | 16 | 295   | 38 | 65    | 33 | -67 | +      | 34     | -                               | +4.2 | +7.0 | - |
| 8         |    | 26.5 | 52 | 42 | 296   | 20 | 64    | 51 | -67 | +      | 36     | -                               | +4.3 | +6.9 | - |
| 9         |    | 26.6 | 53 | 8  | 297   | 1  | 64    | 10 | -66 | +      | 37     | -                               | +4.5 | +6.7 | - |
| 10        |    | 26.6 | 53 | 35 | 297   | 41 | 63    | 31 | -66 | +      | 39     | -                               | +4.6 | +6.6 | - |
| 11        |    | 26.7 | 54 | 3  | 298   | 20 | 62    | 52 | -65 | +      | 40     | -                               | +4.7 | +6.4 | - |
| 12        |    | 26.7 | 54 | 31 | 298   | 58 | 62    | 14 | -64 | +      | 41     | -                               | +4.8 | +6.3 | - |
| 13        |    | 26.7 | 55 | 0  | 299   | 35 | 61    | 37 | -64 | +      | 43     | -                               | +4.9 | +6.2 | - |
| 14        |    | 26.8 | 55 | 29 | 300   | 12 | 61    | 1  | -63 | +      | 44     | -                               | +4.9 | +6.0 | - |
| 15        |    | 26.8 | 55 | 59 | 300   | 47 | 60    | 25 | -62 | +      | 45     | -                               | +5.0 | +5.9 | - |
| 16        |    | 26.9 | 56 | 29 | 301   | 22 | 59    | 51 | -62 | +      | 46     | -                               | +5.1 | +5.7 | - |
| 17        |    | 26.9 | 57 | 0  | 301   | 56 | 59    | 18 | -61 | +      | 47     | -                               | +5.2 | +5.6 | - |
| 18        |    | 27.0 | 57 | 32 | 302   | 29 | 58    | 45 | -60 | +      | 48     | -                               | +5.3 | +5.4 | - |
| 19        |    | 27.0 | 58 | 4  | 303   | 1  | 58    | 13 | -60 | +      | 49     | -                               | +5.4 | +5.3 | - |
| +20       | 14 | 27.1 | 58 | 36 | 303   | 33 | 57    | 42 | -59 | +      | 50     | -                               | +5.4 | +5.2 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| +0        | m          | '          | '            | '            |
| 5         | +0.05      | +0.1       | 0.0          | -0.4         |
| 10        | 0.05       | 0.1        | 0.0          | 0.4          |
| 15        | 0.05       | 0.1        | 0.0          | 0.4          |
| +20       | +0.05      | +0.2       | -0.1         | -0.4         |



TABLE II.

Pair No. 123  
 E 140  $\alpha^1$  Herculis 3.1-3.9  $\alpha_{1950}$   $\delta_{1950}$   
 W 98  $\beta$  Leonis 2.2 11 46.5 +14 51

| $\phi$ | S  |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |   |      |   |
|--------|----|------|----|----|-------|----|-------|----|-----|--------|--------|------------------------------|---|------|---|
|        | h  | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                   | E | W    |   |
| +0     | 14 | 29.2 | 43 | 26 | 248   | 44 | 111   | 54 | -70 | -30    | +      | -3.7                         | + | 9.8  | - |
| 1      |    | 29.2 | 43 | 4  | 249   | 43 | 110   | 54 | -70 | -28    | +      | -3.5                         | + | 10.0 | - |
| 2      |    | 29.2 | 42 | 44 | 250   | 44 | 109   | 53 | -71 | -25    | +      | -3.4                         | + | 10.3 | - |
| 3      |    | 29.3 | 42 | 24 | 251   | 46 | 108   | 52 | -71 | -23    | +      | -3.2                         | + | 10.4 | - |
| 4      |    | 29.3 | 42 | 6  | 252   | 49 | 107   | 49 | -71 | -20    | +      | -3.0                         | + | 10.5 | - |
| 5      |    | 29.3 | 41 | 48 | 253   | 53 | 106   | 45 | -72 | -18    | +      | -2.8                         | + | 10.7 | - |
| 6      |    | 29.3 | 41 | 32 | 254   | 58 | 105   | 40 | -72 | -15    | +      | -2.7                         | + | 10.9 | - |
| 7      |    | 29.3 | 41 | 16 | 256   | 3  | 104   | 34 | -72 | -12    | +      | -2.5                         | + | 11.0 | - |
| 8      |    | 29.4 | 41 | 2  | 257   | 10 | 103   | 28 | -72 | -10    | +      | -2.3                         | + | 11.2 | - |
| 9      |    | 29.4 | 40 | 49 | 258   | 18 | 102   | 20 | -72 | -7     | +      | -2.1                         | + | 11.3 | - |
| 10     |    | 29.4 | 40 | 37 | 259   | 26 | 101   | 12 | -72 | -4     | +      | -1.9                         | + | 11.5 | - |
| 11     |    | 29.4 | 40 | 26 | 260   | 35 | 100   | 3  | -73 | -1     | +      | -1.8                         | + | 11.6 | - |
| 12     |    | 29.5 | 40 | 17 | 261   | 45 | 98    | 53 | -73 | +3     | -      | -1.5                         | + | 11.7 | - |
| 13     |    | 29.5 | 40 | 8  | 262   | 55 | 97    | 43 | -72 | +6     | -      | -1.3                         | + | 11.8 | - |
| 14     |    | 29.5 | 40 | 1  | 264   | 6  | 96    | 33 | -72 | +9     | -      | -1.1                         | + | 11.9 | - |
| 15     |    | 29.5 | 39 | 55 | 265   | 17 | 95    | 21 | -72 | +12    | -      | -0.9                         | + | 11.9 | - |
| 16     |    | 29.5 | 39 | 51 | 266   | 29 | 94    | 10 | -72 | +15    | -      | -0.7                         | + | 12.0 | - |
| 17     |    | 29.6 | 39 | 47 | 267   | 41 | 92    | 58 | -72 | +18    | -      | -0.5                         | + | 12.0 | - |
| 18     |    | 29.6 | 39 | 45 | 268   | 53 | 91    | 46 | -71 | +21    | -      | -0.3                         | + | 12.0 | - |
| 19     |    | 29.6 | 39 | 44 | 270   | 5  | 90    | 34 | -71 | +24    | -      | 0.0                          | + | 12.1 | - |
| +20    | 14 | 29.6 | 39 | 45 | 271   | 18 | 89    | 22 | -70 | +27    | -      | +0.1                         | + | 12.1 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| 0      | m          | '          | '            | '            |
| +0     | +0.05      | -0.1       | +0.1         | -0.5         |
| 5      | 0.05       | 0.1        | 0.1          | 0.5          |
| 10     | 0.05       | -0.1       | 0.1          | 0.5          |
| 15     | 0.05       | 0.0        | 0.1          | 0.5          |
| +20    | +0.05      | 0.0        | +0.1         | -0.5         |

DATA REQUIRED FOR OBSERVATION.

Pair No. 124  
 E 154 109 Herculis 3.9  $\alpha_{1950}$   $\delta_{1950}$   
 W 93  $\delta$  Leonis 2.6 11 11.5 +20 48

| $\phi$ | S  |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |   |     |   |
|--------|----|------|----|----|-------|----|-------|----|-----|--------|--------|------------------------------|---|-----|---|
|        | h  | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                   | E | W   |   |
| +0     | 14 | 47.1 | 57 | 8  | 243   | 50 | 115   | 0  | -68 | -22    | +      | -4.4                         | + | 5.8 | - |
| 1      |    | 47.0 | 56 | 43 | 244   | 25 | 114   | 25 | -68 | -20    | +      | -4.2                         | + | 5.9 | - |
| 2      |    | 47.0 | 56 | 18 | 245   | 1  | 113   | 49 | -68 | -19    | +      | -4.1                         | + | 6.1 | - |
| 3      |    | 46.9 | 55 | 53 | 245   | 38 | 113   | 12 | -69 | -17    | +      | -4.0                         | + | 6.2 | - |
| 4      |    | 46.9 | 55 | 29 | 246   | 15 | 112   | 34 | -69 | -16    | +      | -3.9                         | + | 6.3 | - |
| 5      |    | 46.9 | 55 | 6  | 246   | 54 | 111   | 56 | -69 | -14    | +      | -3.8                         | + | 6.4 | - |
| 6      |    | 46.8 | 54 | 43 | 247   | 33 | 111   | 17 | -69 | -12    | +      | -3.7                         | + | 6.6 | - |
| 7      |    | 46.8 | 54 | 21 | 248   | 12 | 110   | 37 | -69 | -11    | +      | -3.6                         | + | 6.7 | - |
| 8      |    | 46.7 | 54 | 0  | 248   | 53 | 109   | 56 | -69 | -9     | +      | -3.5                         | + | 6.8 | - |
| 9      |    | 46.7 | 53 | 39 | 249   | 34 | 109   | 15 | -70 | -7     | +      | -3.4                         | + | 6.9 | - |
| 10     |    | 46.6 | 53 | 19 | 250   | 15 | 108   | 33 | -70 | -5     | +      | -3.3                         | + | 7.0 | - |
| 11     |    | 46.6 | 53 | 0  | 250   | 58 | 107   | 50 | -70 | -4     | +      | -3.2                         | + | 7.1 | - |
| 12     |    | 46.6 | 52 | 41 | 251   | 41 | 107   | 7  | -70 | -2     | +      | -3.0                         | + | 7.2 | - |
| 13     |    | 46.5 | 52 | 23 | 252   | 25 | 106   | 23 | -70 | 0      |        | -2.9                         | + | 7.3 | - |
| 14     |    | 46.5 | 52 | 6  | 253   | 9  | 105   | 38 | -70 | +2     | -      | -2.8                         | + | 7.4 | - |
| 15     |    | 46.4 | 51 | 50 | 253   | 54 | 104   | 53 | -70 | +4     | -      | -2.7                         | + | 7.6 | - |
| 16     |    | 46.4 | 51 | 34 | 254   | 40 | 104   | 7  | -70 | +6     | -      | -2.5                         | + | 7.6 | - |
| 17     |    | 46.3 | 51 | 19 | 255   | 26 | 103   | 21 | -70 | +8     | -      | -2.4                         | + | 7.7 | - |
| 18     |    | 46.3 | 51 | 5  | 256   | 12 | 102   | 34 | -70 | +10    | -      | -2.3                         | + | 7.8 | - |
| 19     |    | 46.2 | 50 | 52 | 257   | 0  | 101   | 46 | -69 | +12    | -      | -2.1                         | + | 7.9 | - |
| +20    | 14 | 46.2 | 50 | 39 | 257   | 47 | 100   | 58 | -69 | +14    | -      | -2.0                         | + | 8.0 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| 0      | m          | '          | '            | '            |
| +0     | +0.05      | -0.1       | -0.1         | -0.4         |
| 5      | 0.05       | 0.1        | -0.1         | 0.4          |
| 10     | 0.05       | 0.1        | 0.0          | 0.4          |
| 15     | 0.05       | 0.1        | 0.0          | 0.4          |
| +20    | +0.05      | -0.1       | 0.0          | -0.4         |



TABLE II.

|              |   | No. | Star             | Mag. | $\alpha_{1950}$                 | $\delta_{1950}$  |
|--------------|---|-----|------------------|------|---------------------------------|------------------|
| Pair No. 125 | E | 149 | 67 Ophiuchi      | 4.0  | $17^{\text{h}} 58.1^{\text{m}}$ | $+2^{\circ} 56'$ |
|              | W | 99  | $\beta$ Virginis | 3.8  | $11^{\text{h}} 48.1^{\text{m}}$ | $+2^{\circ} 3'$  |

| $\varphi$ | S  | z                 | $A_E$            | $A_W$ | dz | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|--|-------------------|------------------|-------|----|--------|--------|---------------------------------|------------|---|
|           |  |                   |                  |       |    |        |        | $\Delta z$                      | $\Delta A$ |   |
|           |  |                   |                  |       |    |        |        | E                               | W          |   |
| + 0       | $14^{\text{h}} 53.2^{\text{m}} 46^{\circ} 56'$ | $265^{\circ} 59'$ | $92^{\circ} 48'$ | -75   | -  | 4      | +      | -0.6                            | + 9.4      | - |
| 1         | $53.2^{\text{m}} 46^{\circ} 53'$               | $266^{\circ} 55'$ | $91^{\circ} 52'$ | -75   | -  | 2      | +      | -0.4                            | + 9.4      | - |
| 2         | $53.1^{\text{m}} 46^{\circ} 51'$               | $267^{\circ} 51'$ | $90^{\circ} 56'$ | -75   | +  | 1      | -      | -0.3                            | + 9.4      | - |
| 3         | $53.1^{\text{m}} 46^{\circ} 50'$               | $268^{\circ} 47'$ | $89^{\circ} 59'$ | -75   | +  | 3      | -      | -0.1                            | + 9.4      | - |
| 4         | $53.0^{\text{m}} 46^{\circ} 49'$               | $269^{\circ} 43'$ | $89^{\circ} 3'$  | -75   | +  | 6      | -      | +0.1                            | + 9.4      | - |
| 5         | $53.0^{\text{m}} 46^{\circ} 50'$               | $270^{\circ} 40'$ | $88^{\circ} 7'$  | -75   | +  | 8      | -      | +0.2                            | + 9.4      | - |
| 6         | $52.9^{\text{m}} 46^{\circ} 52'$               | $271^{\circ} 36'$ | $87^{\circ} 10'$ | -75   | +  | 11     | -      | +0.4                            | + 9.4      | - |
| 7         | $52.9^{\text{m}} 46^{\circ} 55'$               | $272^{\circ} 32'$ | $86^{\circ} 14'$ | -74   | +  | 13     | -      | +0.6                            | + 9.3      | - |
| 8         | $52.9^{\text{m}} 46^{\circ} 59'$               | $273^{\circ} 28'$ | $85^{\circ} 18'$ | -74   | +  | 16     | -      | +0.7                            | + 9.3      | - |
| 9         | $52.8^{\text{m}} 47^{\circ} 4'$                | $274^{\circ} 23'$ | $84^{\circ} 22'$ | -74   | +  | 18     | -      | +0.9                            | + 9.3      | - |
| 10        | $52.8^{\text{m}} 47^{\circ} 9'$                | $275^{\circ} 19'$ | $83^{\circ} 27'$ | -73   | +  | 20     | -      | +1.0                            | + 9.2      | - |
| 11        | $52.7^{\text{m}} 47^{\circ} 16'$               | $276^{\circ} 14'$ | $82^{\circ} 31'$ | -73   | +  | 23     | -      | +1.2                            | + 9.2      | - |
| 12        | $52.7^{\text{m}} 47^{\circ} 24'$               | $277^{\circ} 8'$  | $81^{\circ} 36'$ | -73   | +  | 25     | -      | +1.4                            | + 9.1      | - |
| 13        | $52.6^{\text{m}} 47^{\circ} 32'$               | $278^{\circ} 3'$  | $80^{\circ} 42'$ | -72   | +  | 27     | -      | +1.5                            | + 9.0      | - |
| 14        | $52.6^{\text{m}} 47^{\circ} 42'$               | $278^{\circ} 57'$ | $79^{\circ} 48'$ | -72   | +  | 30     | -      | +1.7                            | + 9.0      | - |
| 15        | $52.5^{\text{m}} 47^{\circ} 52'$               | $279^{\circ} 50'$ | $78^{\circ} 54'$ | -71   | +  | 32     | -      | +1.8                            | + 8.9      | - |
| 16        | $52.5^{\text{m}} 48^{\circ} 4'$                | $280^{\circ} 43'$ | $78^{\circ} 1'$  | -71   | +  | 34     | -      | +2.0                            | + 8.8      | - |
| 17        | $52.4^{\text{m}} 48^{\circ} 16'$               | $281^{\circ} 35'$ | $77^{\circ} 8'$  | -70   | +  | 36     | -      | +2.1                            | + 8.7      | - |
| 18        | $52.4^{\text{m}} 48^{\circ} 29'$               | $282^{\circ} 27'$ | $76^{\circ} 16'$ | -69   | +  | 38     | -      | +2.3                            | + 8.6      | - |
| 19        | $52.4^{\text{m}} 48^{\circ} 43'$               | $283^{\circ} 18'$ | $75^{\circ} 24'$ | -69   | +  | 40     | -      | +2.4                            | + 8.5      | - |
| +20       | $14^{\text{h}} 52.3^{\text{m}} 48^{\circ} 58'$ | $284^{\circ} 9'$  | $74^{\circ} 33'$ | -68   | +  | 42     | -      | +2.6                            | + 8.4      | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$         | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|--------------------|------------|--------------|--------------|
| + 0       | $+0.05^{\text{m}}$ | 0.0        | 0.0          | -0.5         |
| 5         | 0.05               | 0.0        | 0.0          | 0.5          |
| 10        | 0.05               | 0.0        | 0.0          | 0.5          |
| 15        | 0.05               | +0.1       | 0.0          | 0.5          |
| +20       | +0.05              | +0.1       | 0.0          | -0.5         |

|              |   | No. | Star            | Mag. | $\alpha_{1950}$                 | $\delta_{1950}$   |
|--------------|---|-----|-----------------|------|---------------------------------|-------------------|
| Pair No. 126 | E | 155 | 110 Hereulis    | 4.3  | $18^{\text{h}} 43.5^{\text{m}}$ | $+20^{\circ} 30'$ |
|              | W | 93  | $\delta$ Leonis | 2.6  | $11^{\text{h}} 11.5^{\text{m}}$ | $+20^{\circ} 48'$ |

| $\varphi$ | S  | z                 | $A_E$             | $A_W$ | dz | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|--|-------------------|-------------------|-------|----|--------|--------|---------------------------------|------------|---|
|           |  |                   |                   |       |    |        |        | $\Delta z$                      | $\Delta A$ |   |
|           |  |                   |                   |       |    |        |        | E                               | W          |   |
| + 0       | $14^{\text{h}} 57.3^{\text{m}} 59^{\circ} 29'$ | $246^{\circ} 1'$  | $114^{\circ} 20'$ | -68   | -  | 19     | +      | -4.1                            | + 5.4      | - |
| 1         | $57.3^{\text{m}} 59^{\circ} 5'$                | $246^{\circ} 34'$ | $113^{\circ} 48'$ | -69   | -  | 17     | +      | -4.0                            | + 5.5      | - |
| 2         | $57.4^{\text{m}} 58^{\circ} 41'$               | $247^{\circ} 7'$  | $113^{\circ} 14'$ | -69   | -  | 16     | +      | -3.9                            | + 5.7      | - |
| 3         | $57.4^{\text{m}} 58^{\circ} 18'$               | $247^{\circ} 41'$ | $112^{\circ} 41'$ | -69   | -  | 14     | +      | -3.8                            | + 5.7      | - |
| 4         | $57.4^{\text{m}} 57^{\circ} 55'$               | $248^{\circ} 15'$ | $112^{\circ} 6'$  | -69   | -  | 13     | +      | -3.7                            | + 5.8      | - |
| 5         | $57.4^{\text{m}} 57^{\circ} 33'$               | $248^{\circ} 51'$ | $111^{\circ} 31'$ | -70   | -  | 11     | +      | -3.6                            | + 5.9      | - |
| 6         | $57.4^{\text{m}} 57^{\circ} 11'$               | $249^{\circ} 27'$ | $110^{\circ} 55'$ | -70   | -  | 10     | +      | -3.6                            | + 6.0      | - |
| 7         | $57.4^{\text{m}} 56^{\circ} 50'$               | $250^{\circ} 3'$  | $110^{\circ} 19'$ | -70   | -  | 8      | +      | -3.4                            | + 6.1      | - |
| 8         | $57.4^{\text{m}} 56^{\circ} 30'$               | $250^{\circ} 40'$ | $109^{\circ} 42'$ | -70   | -  | 6      | +      | -3.3                            | + 6.2      | - |
| 9         | $57.5^{\text{m}} 56^{\circ} 10'$               | $251^{\circ} 18'$ | $109^{\circ} 4'$  | -70   | -  | 5      | +      | -3.2                            | + 6.4      | - |
| 10        | $57.5^{\text{m}} 55^{\circ} 51'$               | $251^{\circ} 57'$ | $108^{\circ} 26'$ | -70   | -  | 3      | +      | -3.1                            | + 6.5      | - |
| 11        | $57.5^{\text{m}} 55^{\circ} 32'$               | $252^{\circ} 36'$ | $107^{\circ} 47'$ | -70   | -  | 1      | +      | -3.0                            | + 6.6      | - |
| 12        | $57.5^{\text{m}} 55^{\circ} 15'$               | $253^{\circ} 15'$ | $107^{\circ} 7'$  | -70   | +  | 1      | -      | -2.9                            | + 6.6      | - |
| 13        | $57.5^{\text{m}} 54^{\circ} 58'$               | $253^{\circ} 55'$ | $106^{\circ} 27'$ | -70   | +  | 2      | -      | -2.8                            | + 6.7      | - |
| 14        | $57.5^{\text{m}} 54^{\circ} 41'$               | $254^{\circ} 36'$ | $105^{\circ} 47'$ | -70   | +  | 4      | -      | -2.7                            | + 6.8      | - |
| 15        | $57.5^{\text{m}} 54^{\circ} 25'$               | $255^{\circ} 17'$ | $105^{\circ} 5'$  | -70   | +  | 6      | -      | -2.6                            | + 6.9      | - |
| 16        | $57.5^{\text{m}} 54^{\circ} 10'$               | $255^{\circ} 59'$ | $104^{\circ} 24'$ | -70   | +  | 8      | -      | -2.5                            | + 7.0      | - |
| 17        | $57.6^{\text{m}} 53^{\circ} 56'$               | $256^{\circ} 41'$ | $103^{\circ} 42'$ | -70   | +  | 10     | -      | -2.3                            | + 7.1      | - |
| 18        | $57.6^{\text{m}} 53^{\circ} 42'$               | $257^{\circ} 24'$ | $102^{\circ} 59'$ | -70   | +  | 11     | -      | -2.2                            | + 7.2      | - |
| 19        | $57.6^{\text{m}} 53^{\circ} 29'$               | $258^{\circ} 7'$  | $102^{\circ} 16'$ | -69   | +  | 13     | -      | -2.1                            | + 7.3      | - |
| +20       | $14^{\text{h}} 57.6^{\text{m}} 53^{\circ} 17'$ | $258^{\circ} 51'$ | $101^{\circ} 32'$ | -69   | +  | 15     | -      | -2.0                            | + 7.3      | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$         | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|--------------------|------------|--------------|--------------|
| + 0       | $+0.05^{\text{m}}$ | -0.1       | -0.1         | -0.4         |
| 5         | 0.05               | 0.1        | 0.1          | 0.4          |
| 10        | 0.05               | 0.1        | 0.1          | 0.4          |
| 15        | 0.05               | 0.1        | 0.1          | 0.4          |
| +20       | +0.05              | -0.1       | -0.1         | -0.4         |



TABLE II.

| Pair No. | E | No. | Star        | Mag. | $\alpha_{1950}$ |              | $\delta_{1950}$ |              |
|----------|---|-----|-------------|------|-----------------|--------------|-----------------|--------------|
|          |   |     |             |      | <sup>h</sup>    | <sup>m</sup> | <sup>°</sup>    | <sup>'</sup> |
| 127      | E | 150 | 72 Ophiuchi | 3.7  | 18              | 5.0          | +9              | 33           |
|          | W | 101 | o Virginis  | 4.2  | 12              | 2.7          | +9              | 1            |

| $\varphi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|---------------------------------|------------|---|
|           | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                      | $\Delta A$ | E |
| +0        | 15           | 4.0          | 46           | 38           | 256          | 48           | 102          | 26           | -73 | -16    | +      | -2.2                            | +9.2       | - |
| 1         |              | 4.0          | 46           | 25           | 257          | 44           | 101          | 31           | -73 | -14    | +      | -2.1                            | +9.3       | - |
| 2         |              | 4.0          | 46           | 14           | 258          | 40           | 100          | 34           | -74 | -11    | +      | -1.9                            | +9.4       | - |
| 3         |              | 3.9          | 46           | 3            | 259          | 36           | 99           | 38           | -74 | -9     | +      | -1.7                            | +9.5       | - |
| 4         |              | 3.9          | 45           | 53           | 260          | 33           | 98           | 41           | -74 | -6     | +      | -1.6                            | +9.6       | - |
| 5         |              | 3.9          | 45           | 44           | 261          | 31           | 97           | 43           | -74 | -4     | +      | -1.4                            | +9.7       | - |
| 6         |              | 3.8          | 45           | 36           | 262          | 29           | 96           | 45           | -74 | -1     | +      | -1.2                            | +9.7       | - |
| 7         |              | 3.8          | 45           | 29           | 263          | 28           | 95           | 46           | -74 | +1     | -      | -1.1                            | +9.8       | - |
| 8         |              | 3.8          | 45           | 23           | 264          | 27           | 94           | 47           | -74 | +4     | -      | -0.9                            | +9.8       | - |
| 9         |              | 3.8          | 45           | 18           | 265          | 26           | 93           | 48           | -74 | +6     | -      | -0.7                            | +9.9       | - |
| 10        |              | 3.7          | 45           | 14           | 266          | 25           | 92           | 49           | -74 | +9     | -      | -0.6                            | +9.9       | - |
| 11        |              | 3.7          | 45           | 11           | 267          | 24           | 91           | 49           | -73 | +12    | -      | -0.4                            | +9.9       | - |
| 12        |              | 3.7          | 45           | 10           | 268          | 24           | 90           | 49           | -73 | +14    | -      | -0.2                            | +9.9       | - |
| 13        |              | 3.7          | 45           | 9            | 269          | 23           | 89           | 50           | -73 | +17    | -      | 0.0                             | +9.9       | - |
| 14        |              | 3.6          | 45           | 9            | 270          | 23           | 88           | 50           | -73 | +19    | -      | +0.1                            | +9.9       | - |
| 15        |              | 3.6          | 45           | 10           | 271          | 22           | 87           | 50           | -72 | +22    | -      | +0.3                            | +9.9       | - |
| 16        |              | 3.6          | 45           | 13           | 272          | 22           | 86           | 50           | -72 | +25    | -      | +0.5                            | +9.9       | - |
| 17        |              | 3.5          | 45           | 16           | 273          | 21           | 85           | 51           | -72 | +27    | -      | +0.7                            | +9.9       | - |
| 18        |              | 3.5          | 45           | 21           | 274          | 20           | 84           | 52           | -71 | +30    | -      | +0.8                            | +9.8       | - |
| 19        |              | 3.5          | 45           | 26           | 275          | 19           | 83           | 53           | -71 | +32    | -      | +1.0                            | +9.8       | - |
| +20       | 15           | 3.4          | 45           | 33           | 276          | 17           | 82           | 54           | -70 | +34    | -      | +1.2                            | +9.8       | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$            | $\delta z$           | $\delta A_E$        | $\delta A_W$         |
|-----------|-----------------------|----------------------|---------------------|----------------------|
| +0        | <sup>m</sup><br>+0.05 | <sup>'</sup><br>-0.1 | <sup>'</sup><br>0.0 | <sup>'</sup><br>-0.5 |
| 5         | 0.05                  | 0.0                  | 0.0                 | 0.5                  |
| 10        | 0.05                  | 0.0                  | 0.0                 | 0.5                  |
| 15        | 0.05                  | 0.0                  | 0.0                 | 0.5                  |
| +20       | +0.05                 | 0.0                  | 0.0                 | -0.5                 |

DATA REQUIRED FOR OBSERVATION.

| Pair No. | E | No. | Star             | Mag. | $\alpha_{1950}$ |              | $\delta_{1950}$ |              |
|----------|---|-----|------------------|------|-----------------|--------------|-----------------|--------------|
|          |   |     |                  |      | <sup>h</sup>    | <sup>m</sup> | <sup>°</sup>    | <sup>'</sup> |
| 128      | E | 156 | $\gamma$ Lyrae   | 3.3  | 18              | 57.1         | +32             | 37           |
|          | W | 95  | $\nu$ Ursae Maj. | 3.7  | 11              | 15.8         | +33             | 22           |

| $\varphi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|---------------------------------|------------|---|
|           | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                      | $\Delta A$ | E |
| +0        | 15           | 5.8          | 63           | 50           | 233          | 6            | 127          | 47           | -59 | -23    | +      | -6.1                            | +3.9       | - |
| 1         |              | 5.8          | 63           | 14           | 233          | 29           | 127          | 24           | -60 | -22    | +      | -6.0                            | +4.0       | - |
| 2         |              | 5.9          | 62           | 38           | 233          | 54           | 126          | 59           | -60 | -21    | +      | -6.0                            | +4.2       | - |
| 3         |              | 5.9          | 62           | 3            | 234          | 19           | 126          | 34           | -60 | -20    | +      | -5.9                            | +4.3       | - |
| 4         |              | 5.9          | 61           | 28           | 234          | 46           | 126          | 8            | -61 | -19    | +      | -5.8                            | +4.4       | - |
| 5         |              | 6.0          | 60           | 53           | 235          | 12           | 125          | 41           | -61 | -18    | +      | -5.8                            | +4.6       | - |
| 6         |              | 6.0          | 60           | 18           | 235          | 40           | 125          | 13           | -61 | -17    | +      | -5.7                            | +4.7       | - |
| 7         |              | 6.0          | 59           | 44           | 236          | 9            | 124          | 45           | -62 | -16    | +      | -5.6                            | +4.8       | - |
| 8         |              | 6.1          | 59           | 11           | 236          | 38           | 124          | 15           | -62 | -15    | +      | -5.6                            | +5.0       | - |
| 9         |              | 6.1          | 58           | 38           | 237          | 8            | 123          | 45           | -62 | -14    | +      | -5.5                            | +5.1       | - |
| 10        |              | 6.1          | 58           | 5            | 237          | 39           | 123          | 14           | -62 | -12    | +      | -5.4                            | +5.3       | - |
| 11        |              | 6.2          | 57           | 32           | 238          | 11           | 122          | 43           | -62 | -11    | +      | -5.3                            | +5.4       | - |
| 12        |              | 6.2          | 57           | 1            | 238          | 44           | 122          | 10           | -62 | -10    | +      | -5.3                            | +5.5       | - |
| 13        |              | 6.2          | 56           | 29           | 239          | 18           | 121          | 37           | -62 | -9     | +      | -5.2                            | +5.7       | - |
| 14        |              | 6.3          | 55           | 59           | 239          | 52           | 121          | 2            | -63 | -7     | +      | -5.1                            | +5.8       | - |
| 15        |              | 6.3          | 55           | 28           | 240          | 28           | 120          | 27           | -63 | -6     | +      | -5.0                            | +6.0       | - |
| 16        |              | 6.3          | 54           | 59           | 241          | 4            | 119          | 51           | -63 | -5     | +      | -4.9                            | +6.1       | - |
| 17        |              | 6.4          | 54           | 29           | 241          | 41           | 119          | 14           | -63 | -3     | +      | -4.8                            | +6.3       | - |
| 18        |              | 6.4          | 54           | 1            | 242          | 19           | 118          | 36           | -63 | -2     | +      | -4.7                            | +6.4       | - |
| 19        |              | 6.4          | 53           | 33           | 242          | 58           | 117          | 58           | -63 | 0      |        | -4.6                            | +6.6       | - |
| +20       | 15           | 6.5          | 53           | 5            | 243          | 38           | 117          | 18           | -63 | +1     | -      | -4.5                            | +6.7       | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$            | $\delta z$           | $\delta A_E$         | $\delta A_W$         |
|-----------|-----------------------|----------------------|----------------------|----------------------|
| +0        | <sup>m</sup><br>+0.05 | <sup>'</sup><br>-0.1 | <sup>'</sup><br>-0.2 | <sup>'</sup><br>-0.3 |
| 5         | 0.05                  | 0.1                  | 0.1                  | 0.4                  |
| 10        | 0.05                  | 0.1                  | 0.1                  | 0.4                  |
| 15        | 0.05                  | 0.1                  | 0.1                  | 0.4                  |
| +20       | +0.05                 | -0.1                 | -0.1                 | -0.4                 |



TABLE II.

|              | No.   | Star              | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|--------------|-------|-------------------|------|---------------------------|---------------------------|
|              |       |                   |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 129 | E 144 | $\beta$ Ophiuchi  | 2.9  | 17 41.0                   | +4 35                     |
|              | W 106 | $\delta$ Virginis | 3.7  | 12 53.1                   | +3 40                     |

| $\phi$ | S  |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |            |       |   |
|--------|----|------|----|----|-------|----|-------|----|-----|--------|--------|------------------------------|------------|-------|---|
|        | h  | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                   | $\Delta A$ | E     | W |
| +0     | 15 | 17.2 | 36 | 49 | 262   | 19 | 96    | 7  | -74 | -      | 13     | +                            | -1.2       | +13.3 | - |
| 1      |    | 17.2 | 36 | 42 | 263   | 39 | 94    | 47 | -75 | -      | 9      | +                            | -1.0       | +13.3 | - |
| 2      |    | 17.1 | 36 | 37 | 265   | 0  | 93    | 27 | -75 | -      | 5      | +                            | -0.7       | +13.4 | - |
| 3      |    | 17.1 | 36 | 34 | 266   | 20 | 92    | 6  | -75 | -      | 1      | +                            | -0.5       | +13.4 | - |
| 4      |    | 17.0 | 36 | 31 | 267   | 41 | 90    | 45 | -75 | +      | 3      | -                            | -0.3       | +13.5 | - |
| 5      |    | 17.0 | 36 | 30 | 269   | 2  | 89    | 24 | -75 | +      | 6      | -                            | 0.0        | +13.5 | - |
| 6      |    | 16.9 | 36 | 31 | 270   | 23 | 88    | 3  | -75 | +      | 10     | -                            | +0.2       | +13.5 | - |
| 7      |    | 16.8 | 36 | 33 | 271   | 44 | 86    | 42 | -74 | +      | 14     | -                            | +0.4       | +13.4 | - |
| 8      |    | 16.8 | 36 | 36 | 273   | 4  | 85    | 21 | -74 | +      | 18     | -                            | +0.7       | +13.4 | - |
| 9      |    | 16.7 | 36 | 41 | 274   | 24 | 84    | 1  | -74 | +      | 21     | -                            | +0.9       | +13.4 | - |
| 10     |    | 16.7 | 35 | 47 | 275   | 44 | 82    | 41 | -73 | +      | 25     | -                            | +1.1       | +13.3 | - |
| 11     |    | 16.6 | 36 | 54 | 277   | 4  | 81    | 21 | -73 | +      | 28     | -                            | +1.4       | +13.2 | - |
| 12     |    | 16.6 | 37 | 3  | 278   | 22 | 80    | 2  | -72 | +      | 32     | -                            | +1.6       | +13.0 | - |
| 13     |    | 16.5 | 37 | 14 | 279   | 40 | 78    | 44 | -72 | +      | 35     | -                            | +1.8       | +12.9 | - |
| 14     |    | 16.4 | 37 | 25 | 280   | 57 | 77    | 27 | -71 | +      | 38     | -                            | +2.0       | +12.8 | - |
| 15     |    | 16.4 | 37 | 38 | 282   | 13 | 76    | 10 | -70 | +      | 42     | -                            | +2.3       | +12.6 | - |
| 16     |    | 16.3 | 37 | 52 | 283   | 28 | 74    | 54 | -70 | +      | 45     | -                            | +2.5       | +12.4 | - |
| 17     |    | 16.3 | 38 | 8  | 284   | 42 | 73    | 40 | -69 | +      | 48     | -                            | +2.7       | +12.2 | - |
| 18     |    | 16.2 | 38 | 24 | 285   | 55 | 72    | 27 | -68 | +      | 50     | -                            | +2.9       | +12.0 | - |
| 19     |    | 16.2 | 38 | 42 | 287   | 7  | 71    | 15 | -67 | +      | 53     | -                            | +3.1       | +11.8 | - |
| +20    | 15 | 16.1 | 39 | 1  | 288   | 17 | 70    | 4  | -66 | +      | 55     | -                            | +3.3       | +11.6 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| 0      | m          | '          | '            | '            |
| +0     | +0.05      | 0.0        | +0.1         | -0.6         |
| 5      | 0.05       | 0.0        | +0.1         | 0.6          |
| 10     | 0.05       | 0.0        | 0.0          | 0.6          |
| 15     | 0.05       | +0.1       | 0.0          | 0.5          |
| +20    | +0.05      | +0.1       | 0.0          | -0.5         |

DATA REQUIRED FOR OBSERVATION.

|              | No.   | Star              | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|--------------|-------|-------------------|------|---------------------------|---------------------------|
|              |       |                   |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 130 | E 149 | 67 Ophiuchi       | 4.0  | 17 58.1                   | +2 56                     |
|              | W 106 | $\delta$ Virginis | 3.7  | 12 53.1                   | +3 40                     |

| $\phi$ | S  |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |            |       |   |
|--------|----|------|----|----|-------|----|-------|----|-----|--------|--------|------------------------------|------------|-------|---|
|        | h  | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                   | $\Delta A$ | E     | W |
| +0     | 15 | 25.5 | 38 | 53 | 265   | 20 | 95    | 52 | -75 | -      | 9      | +                            | -0.9       | +12.4 | - |
| 1      |    | 25.5 | 38 | 48 | 266   | 34 | 94    | 37 | -75 | -      | 5      | +                            | -0.7       | +12.4 | - |
| 2      |    | 25.6 | 38 | 44 | 267   | 49 | 93    | 23 | -75 | -      | 2      | +                            | -0.5       | +12.4 | - |
| 3      |    | 25.6 | 38 | 42 | 269   | 4  | 92    | 8  | -75 | +      | 2      | -                            | -0.3       | +12.5 | - |
| 4      |    | 25.7 | 38 | 41 | 270   | 18 | 90    | 53 | -75 | +      | 5      | -                            | -0.1       | +12.5 | - |
| 5      |    | 25.7 | 38 | 41 | 271   | 34 | 89    | 38 | -75 | +      | 8      | -                            | +0.2       | +12.5 | - |
| 6      |    | 25.8 | 38 | 43 | 272   | 49 | 88    | 23 | -75 | +      | 12     | -                            | +0.4       | +12.5 | - |
| 7      |    | 25.8 | 38 | 46 | 274   | 3  | 87    | 9  | -74 | +      | 15     | -                            | +0.6       | +12.4 | - |
| 8      |    | 25.8 | 38 | 50 | 275   | 18 | 85    | 55 | -74 | +      | 18     | -                            | +0.8       | +12.4 | - |
| 9      |    | 25.9 | 38 | 56 | 276   | 32 | 84    | 41 | -74 | +      | 22     | -                            | +1.0       | +12.3 | - |
| 10     |    | 25.9 | 39 | 3  | 277   | 46 | 83    | 27 | -73 | +      | 25     | -                            | +1.2       | +12.3 | - |
| 11     |    | 26.0 | 39 | 11 | 278   | 54 | 82    | 14 | -73 | +      | 28     | -                            | +1.5       | +12.2 | - |
| 12     |    | 26.0 | 39 | 20 | 280   | 12 | 81    | 2  | -72 | +      | 31     | -                            | +1.7       | +12.0 | - |
| 13     |    | 26.1 | 39 | 31 | 281   | 23 | 79    | 50 | -72 | +      | 34     | -                            | +1.9       | +11.9 | - |
| 14     |    | 26.1 | 39 | 42 | 282   | 35 | 78    | 39 | -71 | +      | 37     | -                            | +2.1       | +11.8 | - |
| 15     |    | 26.1 | 39 | 55 | 283   | 45 | 77    | 29 | -70 | +      | 40     | -                            | +2.3       | +11.7 | - |
| 16     |    | 26.2 | 40 | 10 | 284   | 55 | 76    | 20 | -70 | +      | 43     | -                            | +2.5       | +11.5 | - |
| 17     |    | 26.2 | 40 | 25 | 286   | 3  | 75    | 12 | -69 | +      | 45     | -                            | +2.7       | +11.4 | - |
| 18     |    | 26.3 | 40 | 42 | 287   | 11 | 74    | 5  | -68 | +      | 48     | -                            | +2.9       | +11.2 | - |
| 19     |    | 26.3 | 40 | 59 | 288   | 17 | 72    | 58 | -67 | +      | 50     | -                            | +3.0       | +11.0 | - |
| +20    | 15 | 26.4 | 41 | 18 | 289   | 23 | 71    | 53 | -66 | +      | 52     | -                            | +3.2       | +10.8 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| 0      | m          | '          | '            | '            |
| +0     | +0.05      | 0.0        | 0.0          | -0.5         |
| 5      | 0.05       | 0.0        | 0.0          | 0.5          |
| 10     | 0.05       | 0.0        | 0.0          | 0.5          |
| 15     | 0.05       | +0.1       | 0.0          | 0.5          |
| +20    | +0.05      | +0.1       | -0.1         | -0.5         |



TABLE II.

|              |   | No. | Star             | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|--------------|---|-----|------------------|------|---------------------------|---------------------------|
|              |   |     |                  |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 131 | E | 161 | $\delta$ Aquilæ  | 3.4  | 19 23.0                   | +3 1                      |
|              | W | 99  | $\beta$ Virginis | 3.8  | 11 48.1                   | +2 3                      |

| $\phi$ | S                         |                           | z                         |                           | $A_E$ | $A_W$  | dz   | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |            |  |
|--------|---------------------------|---------------------------|---------------------------|---------------------------|-------|--------|------|--------|--------|------------------------------|------------|--|
|        | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> |       |        |      |        |        | $\Delta z$                   | $\Delta A$ |  |
| +0     | 15 35.6                   | 57 31                     | 266 25                    | 92 25                     | -75   | - 3 +  | -0.5 | + 6.4  | -      |                              |            |  |
| 1      | 35.6                      | 57 29                     | 267 4                     | 91 47                     | -75   | - 1 +  | -0.4 | + 6.4  | -      |                              |            |  |
| 2      | 35.5                      | 57 26                     | 267 42                    | 91 9                      | -75   | + 1 -  | -0.3 | + 6.4  | -      |                              |            |  |
| 3      | 35.5                      | 57 25                     | 268 20                    | 90 31                     | -75   | + 3 -  | -0.2 | + 6.4  | -      |                              |            |  |
| 4      | 35.4                      | 57 24                     | 268 58                    | 89 52                     | -75   | + 5 -  | -0.1 | + 6.4  | -      |                              |            |  |
| 5      | 35.4                      | 57 24                     | 269 37                    | 89 14                     | -75   | + 7 -  | 0.0  | + 6.4  | -      |                              |            |  |
| 6      | 35.4                      | 57 25                     | 270 15                    | 88 35                     | -75   | + 9 -  | +0.1 | + 6.4  | -      |                              |            |  |
| 7      | 35.3                      | 57 26                     | 270 53                    | 87 57                     | -74   | + 11 - | +0.3 | + 6.4  | -      |                              |            |  |
| 8      | 35.3                      | 57 28                     | 271 31                    | 87 19                     | -74   | + 12 - | +0.4 | + 6.4  | -      |                              |            |  |
| 9      | 35.2                      | 57 30                     | 272 10                    | 86 40                     | -74   | + 14 - | +0.5 | + 6.4  | -      |                              |            |  |
| 10     | 35.2                      | 57 33                     | 272 48                    | 86 2                      | -74   | + 16 - | +0.6 | + 6.3  | -      |                              |            |  |
| 11     | 35.1                      | 57 37                     | 273 26                    | 85 24                     | -73   | + 18 - | +0.7 | + 6.3  | -      |                              |            |  |
| 12     | 35.1                      | 57 42                     | 274 3                     | 84 46                     | -73   | + 20 - | +0.8 | + 6.3  | -      |                              |            |  |
| 13     | 35.1                      | 57 47                     | 274 41                    | 84 8                      | -73   | + 21 - | +0.9 | + 6.3  | -      |                              |            |  |
| 14     | 35.0                      | 57 53                     | 275 18                    | 83 30                     | -72   | + 23 - | +1.0 | + 6.2  | -      |                              |            |  |
| 15     | 35.0                      | 57 59                     | 275 56                    | 82 53                     | -72   | + 25 - | +1.1 | + 6.2  | -      |                              |            |  |
| 16     | 34.9                      | 58 7                      | 276 33                    | 82 15                     | -72   | + 27 - | +1.2 | + 6.2  | -      |                              |            |  |
| 17     | 34.9                      | 58 14                     | 277 9                     | 81 38                     | -71   | + 28 - | +1.3 | + 6.1  | -      |                              |            |  |
| 18     | 34.8                      | 58 23                     | 277 46                    | 81 1                      | -71   | + 30 - | +1.5 | + 6.1  | -      |                              |            |  |
| 19     | 34.8                      | 58 32                     | 278 22                    | 80 25                     | -70   | + 31 - | +1.6 | + 6.0  | -      |                              |            |  |
| +20    | 15 34.8                   | 58 41                     | 278 58                    | 79 48                     | -69   | + 33 - | +1.6 | + 6.0  | -      |                              |            |  |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| 0      | m          | '          | '            | '            |
| +0     | +0.05      | 0.0        | -0.1         | -0.4         |
| 5      | 0.05       | 0.0        | -0.1         | 0.4          |
| 10     | 0.05       | 0.0        | 0.1          | 0.4          |
| 15     | 0.05       | 0.0        | 0.2          | 0.4          |
| +20    | +0.05      | 0.0        | -0.2         | -0.4         |

|              |   | No. | Star              | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|--------------|---|-----|-------------------|------|---------------------------|---------------------------|
|              |   |     |                   |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 132 | E | 148 | $\nu$ Ophiuchi    | 3.5  | 17 56.3                   | - 9 46                    |
|              | W | 109 | $\alpha$ Virginis | 1.2  | 13 22.6                   | -10 54                    |

| $\phi$ | S                         |                           | z                         |                           | $A_E$ | $A_W$  | dz   | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |            |  |
|--------|---------------------------|---------------------------|---------------------------|---------------------------|-------|--------|------|--------|--------|------------------------------|------------|--|
|        | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> |       |        |      |        |        | $\Delta z$                   | $\Delta A$ |  |
| +0     | 15 38.8                   | 36 9                      | 286 42                    | 71 18                     | -71   | + 32 - | +3.1 | + 13.1 | -      |                              |            |  |
| 1      | 38.7                      | 36 28                     | 287 59                    | 70 0                      | -71   | + 35 - | +3.3 | + 12.8 | -      |                              |            |  |
| 2      | 38.7                      | 36 48                     | 289 15                    | 68 44                     | -70   | + 39 - | +3.5 | + 12.5 | -      |                              |            |  |
| 3      | 38.6                      | 37 10                     | 290 30                    | 67 30                     | -70   | + 42 - | +3.7 | + 12.3 | -      |                              |            |  |
| 4      | 38.5                      | 37 32                     | 291 42                    | 66 17                     | -69   | + 44 - | +3.9 | + 12.0 | -      |                              |            |  |
| 5      | 38.5                      | 37 56                     | 292 53                    | 65 6                      | -68   | + 47 - | +4.1 | + 11.7 | -      |                              |            |  |
| 6      | 38.4                      | 38 21                     | 294 3                     | 63 56                     | -67   | + 49 - | +4.2 | + 11.4 | -      |                              |            |  |
| 7      | 38.3                      | 38 47                     | 295 10                    | 62 48                     | -67   | + 52 - | +4.4 | + 11.1 | -      |                              |            |  |
| 8      | 38.2                      | 39 14                     | 296 16                    | 61 42                     | -66   | + 54 - | +4.6 | + 10.9 | -      |                              |            |  |
| 9      | 38.2                      | 39 42                     | 297 21                    | 60 37                     | -65   | + 56 - | +4.8 | + 10.6 | -      |                              |            |  |
| 10     | 38.1                      | 40 11                     | 298 23                    | 59 34                     | -64   | + 57 - | +4.9 | + 10.3 | -      |                              |            |  |
| 11     | 38.0                      | 40 41                     | 299 24                    | 58 33                     | -63   | + 59 - | +5.1 | + 10.0 | -      |                              |            |  |
| 12     | 37.9                      | 41 11                     | 300 23                    | 57 33                     | -62   | + 61 - | +5.2 | + 9.7  | -      |                              |            |  |
| 13     | 37.9                      | 41 43                     | 301 21                    | 56 35                     | -61   | + 62 - | +5.4 | + 9.4  | -      |                              |            |  |
| 14     | 37.8                      | 42 16                     | 302 16                    | 55 39                     | -60   | + 64 - | +5.5 | + 9.2  | -      |                              |            |  |
| 15     | 37.7                      | 42 49                     | 303 11                    | 54 45                     | -59   | + 65 - | +5.6 | + 8.9  | -      |                              |            |  |
| 16     | 37.6                      | 43 23                     | 304 3                     | 53 51                     | -59   | + 66 - | +5.8 | + 8.6  | -      |                              |            |  |
| 17     | 37.6                      | 43 58                     | 304 54                    | 53 0                      | -58   | + 67 - | +5.9 | + 8.3  | -      |                              |            |  |
| 18     | 37.5                      | 44 34                     | 305 43                    | 52 10                     | -57   | + 68 - | +6.0 | + 8.1  | -      |                              |            |  |
| 19     | 37.4                      | 45 10                     | 306 31                    | 51 22                     | -56   | + 69 - | +6.1 | + 7.8  | -      |                              |            |  |
| +20    | 15 37.3                   | 45 47                     | 307 17                    | 50 35                     | -55   | + 69 - | +6.2 | + 7.5  | -      |                              |            |  |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| 0      | m          | '          | '            | '            |
| +0     | +0.05      | +0.1       | 0.0          | -0.5         |
| 5      | 0.05       | 0.1        | 0.0          | 0.5          |
| 10     | 0.05       | 0.1        | -0.1         | 0.5          |
| 15     | 0.05       | 0.1        | 0.1          | 0.5          |
| +20    | +0.04      | +0.1       | -0.1         | -0.4         |



TABLE II.

|              |   | No. | Star             | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|--------------|---|-----|------------------|------|---------------------------|---------------------------|
|              |   |     |                  |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 133 | E | 163 | $\gamma$ Aquilæ  | 2.8  | 19 43.9                   | +10 29                    |
|              | W | 101 | $\circ$ Virginis | 4.2  | 12 2.7                    | + 9 1                     |

| $\varphi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |       |   |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|---------------------------------|------------|-------|---|
|           | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                      | $\Delta A$ | E     | W |
| + 0       | 15           | 53.6         | 58           | 47           | 257          | 42           | 100          | 33           | -73 | -      | 9      | +                               | -2.0       | + 5.9 | - |
| 1         |              | 53.5         | 58           | 36           | 258          | 18           | 99           | 57           | -74 | -      | 8      | +                               | -1.9       | + 6.0 | - |
| 2         |              | 53.5         | 58           | 25           | 258          | 54           | 99           | 21           | -74 | -      | 6      | +                               | -1.8       | + 6.0 | - |
| 3         |              | 53.4         | 58           | 14           | 259          | 31           | 98           | 44           | -74 | -      | 4      | +                               | -1.7       | + 6.1 | - |
| 4         |              | 53.4         | 58           | 5            | 260          | 7            | 98           | 8            | -74 | -      | 2      | +                               | -1.6       | + 6.1 | - |
| 5         |              | 53.3         | 57           | 56           | 260          | 44           | 97           | 30           | -74 |        | 0      |                                 | -1.5       | + 6.2 | - |
| 6         |              | 53.2         | 57           | 47           | 261          | 22           | 96           | 53           | -74 | +      | 1      | -                               | -1.4       | + 6.2 | - |
| 7         |              | 53.2         | 57           | 39           | 261          | 59           | 96           | 15           | -74 | +      | 3      | -                               | -1.2       | + 6.3 | - |
| 8         |              | 53.1         | 57           | 32           | 262          | 37           | 95           | 37           | -74 | +      | 5      | -                               | -1.1       | + 6.3 | - |
| 9         |              | 53.0         | 57           | 26           | 263          | 15           | 94           | 59           | -74 | +      | 7      | -                               | -1.0       | + 6.3 | - |
| 10        |              | 53.0         | 57           | 20           | 263          | 53           | 94           | 21           | -73 | +      | 9      | -                               | -0.9       | + 6.4 | - |
| 11        |              | 52.9         | 57           | 15           | 264          | 31           | 93           | 42           | -73 | +      | 10     | -                               | -0.8       | + 6.4 | - |
| 12        |              | 52.9         | 57           | 10           | 265          | 9            | 93           | 3            | -73 | +      | 12     | -                               | -0.7       | + 6.4 | - |
| 13        |              | 52.8         | 57           | 7            | 265          | 48           | 92           | 25           | -73 | +      | 14     | -                               | -0.6       | + 6.4 | - |
| 14        |              | 52.7         | 57           | 4            | 266          | 26           | 91           | 46           | -73 | +      | 16     | -                               | -0.5       | + 6.4 | - |
| 15        |              | 52.7         | 57           | 1            | 267          | 5            | 91           | 7            | -72 | +      | 18     | -                               | -0.4       | + 6.4 | - |
| 16        |              | 52.6         | 56           | 59           | 267          | 44           | 90           | 27           | -72 | +      | 20     | -                               | -0.2       | + 6.5 | - |
| 17        |              | 52.5         | 56           | 58           | 268          | 22           | 89           | 48           | -72 | +      | 22     | -                               | -0.1       | + 6.4 | - |
| 18        |              | 52.5         | 56           | 58           | 269          | 1            | 89           | 9            | -71 | +      | 23     | -                               | 0.0        | + 6.4 | - |
| 19        |              | 52.4         | 56           | 58           | 269          | 40           | 88           | 29           | -71 | +      | 25     | -                               | +0.1       | + 6.4 | - |
| +20       | 15           | 52.3         | 56           | 59           | 270          | 18           | 87           | 50           | -70 | +      | 27     | -                               | +0.2       | + 6.4 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| + 0       | m          | '          | '            | '            |
| + 0       | +0.05      | 0.0        | -0.2         | -0.4         |
| 5         | 0.05       | 0.0        | 0.2          | 0.4          |
| 10        | 0.05       | 0.0        | 0.2          | 0.4          |
| 15        | 0.05       | 0.0        | 0.2          | 0.4          |
| +20       | +0.04      | 0.0        | -0.2         | -0.4         |

|              |   | No. | Star            | Mag.    | $\alpha_{1950}$           | $\delta_{1950}$           |
|--------------|---|-----|-----------------|---------|---------------------------|---------------------------|
|              |   |     |                 |         | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 134 | E | 166 | $\eta$ Aquilæ   | 3.7-4.3 | 19 49.9                   | +0 53                     |
|              | W | 103 | $\eta$ Virginis | 4.0     | 12 17.3                   | -0 23                     |

| $\varphi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |       |   |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|---------------------------------|------------|-------|---|
|           | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                      | $\Delta A$ | E     | W |
| + 0       | 16           | 3.7          | 57           | 12           | 268          | 57           | 89           | 32           | -75 |        | 0      |                                 | -0.1       | + 6.5 | - |
| 1         |              | 3.6          | 57           | 12           | 269          | 36           | 88           | 53           | -75 | +      | 2      | -                               | +0.1       | + 6.4 | - |
| 2         |              | 3.6          | 57           | 13           | 270          | 14           | 88           | 15           | -75 | +      | 4      | -                               | +0.2       | + 6.4 | - |
| 3         |              | 3.5          | 57           | 14           | 270          | 53           | 87           | 36           | -75 | +      | 6      | -                               | +0.3       | + 6.4 | - |
| 4         |              | 3.4          | 57           | 16           | 271          | 32           | 86           | 57           | -75 | +      | 7      | -                               | +0.4       | + 6.4 | - |
| 5         |              | 3.4          | 57           | 19           | 272          | 10           | 86           | 19           | -75 | +      | 9      | -                               | +0.5       | + 6.4 | - |
| 6         |              | 3.3          | 57           | 22           | 272          | 48           | 85           | 40           | -74 | +      | 11     | -                               | +0.6       | + 6.4 | - |
| 7         |              | 3.3          | 57           | 26           | 273          | 26           | 85           | 2            | -74 | +      | 13     | -                               | +0.7       | + 6.4 | - |
| 8         |              | 3.2          | 57           | 31           | 274          | 4            | 84           | 24           | -74 | +      | 15     | -                               | +0.8       | + 6.3 | - |
| 9         |              | 3.2          | 57           | 36           | 274          | 42           | 83           | 46           | -74 | +      | 16     | -                               | +1.0       | + 6.3 | - |
| 10        |              | 3.1          | 57           | 43           | 275          | 20           | 83           | 8            | -73 | +      | 18     | -                               | +1.1       | + 6.3 | - |
| 11        |              | 3.1          | 57           | 49           | 275          | 58           | 82           | 30           | -73 | +      | 20     | -                               | +1.2       | + 6.2 | - |
| 12        |              | 3.0          | 57           | 57           | 276          | 35           | 81           | 52           | -73 | +      | 22     | -                               | +1.3       | + 6.2 | - |
| 13        |              | 3.0          | 58           | 5            | 277          | 12           | 81           | 15           | -72 | +      | 23     | -                               | +1.4       | + 6.1 | - |
| 14        |              | 2.9          | 58           | 13           | 277          | 48           | 80           | 38           | -72 | +      | 25     | -                               | +1.5       | + 6.1 | - |
| 15        |              | 2.8          | 58           | 22           | 278          | 25           | 80           | 1            | -71 | +      | 27     | -                               | +1.6       | + 6.0 | - |
| 16        |              | 2.8          | 58           | 32           | 279          | 1            | 79           | 25           | -71 | +      | 29     | -                               | +1.7       | + 6.0 | - |
| 17        |              | 2.7          | 58           | 43           | 279          | 37           | 78           | 48           | -70 | +      | 30     | -                               | +1.8       | + 5.9 | - |
| 18        |              | 2.7          | 58           | 54           | 280          | 12           | 78           | 12           | -70 | +      | 32     | -                               | +1.9       | + 5.9 | - |
| 19        |              | 2.6          | 59           | 6            | 280          | 47           | 77           | 37           | -69 | +      | 33     | -                               | +2.0       | + 5.8 | - |
| +20       | 16           | 2.5          | 59           | 18           | 281          | 22           | 77           | 1            | -69 | +      | 35     | -                               | +2.1       | + 5.8 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| + 0       | m          | '          | '            | '            |
| + 0       | +0.05      | 0.0        | -0.2         | -0.4         |
| 5         | 0.05       | 0.0        | 0.2          | 0.4          |
| 10        | 0.05       | 0.0        | 0.2          | 0.4          |
| 15        | 0.05       | 0.0        | 0.2          | 0.4          |
| +20       | +0.04      | 0.0        | -0.2         | -0.4         |



TABLE II.

|              |   | No. | Star            | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|--------------|---|-----|-----------------|------|---------------------------|---------------------------|
|              |   |     |                 |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 135 | E | 169 | $\theta$ Aquilæ | 3.4  | 20 8.7                    | -0 58                     |
|              | W | 103 | $\eta$ Virginis | 4.0  | 12 17.3                   | -0 23                     |

| $\varphi$ | S                         |                           | z                         |                           | $A_E$                     |                           | $A_W$        |              | dz    | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------------|--------------|-------|--------|--------|---------------------------------|------------|---|
|           | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>'</sup> | <sup>'</sup> |       |        |        | $\Delta z$                      | $\Delta A$ | E |
| +0        | 16 13.1                   | 59 33                     | 271 8                     | 89 33                     | -75                       | + 1                       | -            | +0.2         | + 5.9 | -      |        |                                 |            |   |
| 1         | 13.1                      | 59 34                     | 271 43                    | 88 58                     | -75                       | + 3                       | -            | +0.3         | + 5.9 | -      |        |                                 |            |   |
| 2         | 13.1                      | 59 36                     | 272 18                    | 88 23                     | -75                       | + 4                       | -            | +0.4         | + 5.9 | -      |        |                                 |            |   |
| 3         | 13.1                      | 59 38                     | 272 53                    | 87 48                     | -75                       | + 6                       | -            | +0.4         | + 5.9 | -      |        |                                 |            |   |
| 4         | 13.2                      | 59 41                     | 273 28                    | 87 13                     | -75                       | + 8                       | -            | +0.5         | + 5.8 | -      |        |                                 |            |   |
| 5         | 13.2                      | 59 45                     | 274 3                     | 86 38                     | -75                       | + 10                      | -            | +0.6         | + 5.8 | -      |        |                                 |            |   |
| 6         | 13.2                      | 59 49                     | 274 38                    | 86 3                      | -74                       | + 11                      | -            | +0.7         | + 5.8 | -      |        |                                 |            |   |
| 7         | 13.2                      | 59 54                     | 275 13                    | 85 28                     | -74                       | + 13                      | -            | +0.8         | + 5.8 | -      |        |                                 |            |   |
| 8         | 13.2                      | 59 59                     | 275 48                    | 84 54                     | -74                       | + 15                      | -            | +0.9         | + 5.8 | -      |        |                                 |            |   |
| 9         | 13.3                      | 60 5                      | 276 22                    | 84 19                     | -74                       | + 16                      | -            | +1.0         | + 5.7 | -      |        |                                 |            |   |
| 10        | 13.3                      | 60 11                     | 276 57                    | 83 45                     | -73                       | + 18                      | -            | +1.2         | + 5.7 | -      |        |                                 |            |   |
| 11        | 13.3                      | 60 19                     | 277 31                    | 83 11                     | -73                       | + 20                      | -            | +1.3         | + 5.7 | -      |        |                                 |            |   |
| 12        | 13.3                      | 60 26                     | 278 5                     | 82 37                     | -73                       | + 21                      | -            | +1.4         | + 5.6 | -      |        |                                 |            |   |
| 13        | 13.4                      | 60 35                     | 278 38                    | 82 4                      | -72                       | + 23                      | -            | +1.5         | + 5.6 | -      |        |                                 |            |   |
| 14        | 13.4                      | 60 44                     | 279 12                    | 81 30                     | -72                       | + 25                      | -            | +1.6         | + 5.6 | -      |        |                                 |            |   |
| 15        | 13.4                      | 60 54                     | 279 45                    | 80 57                     | -71                       | + 26                      | -            | +1.7         | + 5.5 | -      |        |                                 |            |   |
| 16        | 13.5                      | 61 4                      | 280 18                    | 80 25                     | -71                       | + 28                      | -            | +1.7         | + 5.5 | -      |        |                                 |            |   |
| 17        | 13.5                      | 61 14                     | 280 50                    | 79 52                     | -71                       | + 29                      | -            | +1.8         | + 5.4 | -      |        |                                 |            |   |
| 18        | 13.5                      | 61 26                     | 281 23                    | 79 20                     | -70                       | + 31                      | -            | +1.9         | + 5.4 | -      |        |                                 |            |   |
| 19        | 13.5                      | 61 37                     | 281 55                    | 78 48                     | -69                       | + 32                      | -            | +2.0         | + 5.3 | -      |        |                                 |            |   |
| +20       | 16 13.6                   | 61 50                     | 282 27                    | 78 17                     | -69                       | + 34                      | -            | +2.1         | + 5.3 | -      |        |                                 |            |   |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| °         | m          | '          | '            | '            |
| +0        | +0.05      | 0.0        | -0.2         | -0.4         |
| 5         | 0.05       | 0.0        | 0.2          | 0.4          |
| 10        | 0.05       | 0.0        | 0.2          | 0.4          |
| 15        | 0.05       | 0.0        | 0.2          | 0.4          |
| +20       | +0.04      | 0.0        | -0.2         | -0.4         |

DATA REQUIRED FOR OBSERVATION.

|              |   | No. | Star                   | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|--------------|---|-----|------------------------|------|---------------------------|---------------------------|
|              |   |     |                        |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 136 | E | 163 | $\gamma$ Aquilæ        | 2.8  | 19 43.9                   | +10 29                    |
|              | W | 107 | $\varepsilon$ Virginis | 3.0  | 12 59.7                   | +11 14                    |

| $\varphi$ | S                         |                           | z                         |                           | $A_E$                     |                           | $A_W$        |              | dz    | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------------|--------------|-------|--------|--------|---------------------------------|------------|---|
|           | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>'</sup> | <sup>'</sup> |       |        |        | $\Delta z$                      | $\Delta A$ | E |
| +0        | 16 21.6                   | 51 58                     | 256 39                    | 104 19                    | -73                       | - 14                      | +            | -2.4         | + 7.6 | -      |        |                                 |            |   |
| 1         | 21.6                      | 51 44                     | 257 24                    | 103 33                    | -73                       | - 12                      | +            | -2.3         | + 7.7 | -      |        |                                 |            |   |
| 2         | 21.6                      | 51 31                     | 258 11                    | 102 47                    | -73                       | - 10                      | +            | -2.1         | + 7.8 | -      |        |                                 |            |   |
| 3         | 21.7                      | 51 19                     | 258 58                    | 102 0                     | -73                       | - 8                       | +            | -2.0         | + 7.9 | -      |        |                                 |            |   |
| 4         | 21.7                      | 51 7                      | 259 45                    | 101 13                    | -74                       | - 6                       | +            | -1.9         | + 7.9 | -      |        |                                 |            |   |
| 5         | 21.7                      | 50 57                     | 260 33                    | 100 25                    | -74                       | - 4                       | +            | -1.7         | + 8.0 | -      |        |                                 |            |   |
| 6         | 21.8                      | 50 47                     | 261 21                    | 99 37                     | -74                       | - 2                       | +            | -1.6         | + 8.1 | -      |        |                                 |            |   |
| 7         | 21.8                      | 50 37                     | 262 10                    | 98 48                     | -74                       | 0                         |              | -1.5         | + 8.1 | -      |        |                                 |            |   |
| 8         | 21.8                      | 50 29                     | 262 58                    | 98 0                      | -74                       | + 2                       | -            | -1.3         | + 8.2 | -      |        |                                 |            |   |
| 9         | 21.9                      | 50 22                     | 263 48                    | 97 10                     | -74                       | + 4                       | -            | -1.2         | + 8.2 | -      |        |                                 |            |   |
| 10        | 21.9                      | 50 15                     | 264 37                    | 96 21                     | -73                       | + 7                       | -            | -1.0         | + 8.3 | -      |        |                                 |            |   |
| 11        | 21.9                      | 50 10                     | 265 27                    | 95 31                     | -73                       | + 9                       | -            | -0.9         | + 8.3 | -      |        |                                 |            |   |
| 12        | 22.0                      | 50 5                      | 266 17                    | 94 41                     | -73                       | + 11                      | -            | -0.7         | + 8.4 | -      |        |                                 |            |   |
| 13        | 22.0                      | 50 1                      | 267 7                     | 93 51                     | -73                       | + 13                      | -            | -0.6         | + 8.4 | -      |        |                                 |            |   |
| 14        | 22.0                      | 49 58                     | 267 58                    | 93 1                      | -73                       | + 16                      | -            | -0.5         | + 8.4 | -      |        |                                 |            |   |
| 15        | 22.1                      | 49 55                     | 268 48                    | 92 11                     | -72                       | + 18                      | -            | -0.3         | + 8.4 | -      |        |                                 |            |   |
| 16        | 22.1                      | 49 54                     | 269 39                    | 91 21                     | -72                       | + 20                      | -            | -0.2         | + 8.4 | -      |        |                                 |            |   |
| 17        | 22.1                      | 49 53                     | 270 30                    | 90 30                     | -72                       | + 22                      | -            | -0.1         | + 8.4 | -      |        |                                 |            |   |
| 18        | 22.2                      | 49 53                     | 271 20                    | 89 40                     | -71                       | + 24                      | -            | +0.1         | + 8.4 | -      |        |                                 |            |   |
| 19        | 22.2                      | 49 54                     | 272 11                    | 88 50                     | -71                       | + 26                      | -            | +0.2         | + 8.4 | -      |        |                                 |            |   |
| +20       | 16 22.3                   | 49 55                     | 273 2                     | 87 59                     | -70                       | + 28                      | -            | +0.3         | + 8.4 | -      |        |                                 |            |   |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| °         | m          | '          | '            | '            |
| +0        | +0.05      | 0.0        | -0.2         | -0.4         |
| 5         | 0.05       | 0.0        | 0.2          | 0.4          |
| 10        | 0.05       | 0.0        | 0.2          | 0.4          |
| 15        | 0.05       | 0.0        | 0.2          | 0.4          |
| +20       | +0.04      | 0.0        | -0.2         | -0.4         |



TABLE II.

|              |   | No. | Star            | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|--------------|---|-----|-----------------|------|---------------------------|---------------------------|
|              |   |     |                 |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 137 | E | 155 | 110 Herculis    | 4.3  | 18 43.5                   | 20 30                     |
|              | W | 115 | $\alpha$ Bootis | 0.2  | 14 13.4                   | 19 27                     |

| $\varphi$ | S                         |                           | z                         |                           | $A_E$                     |                           | $A_W$        |              | dz | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------------|--------------|----|--------|--------|---------------------------------|------------|---|
|           | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>'</sup> | <sup>'</sup> |    |        |        | $\Delta z$                      | $\Delta A$ | E |
| + 0       | 16 29.6                   | 39 9                      | 236 18                    | 121 48                    | -63                       | - 51 +                    | -5.4         | + 10.3       | -  |        |        |                                 |            |   |
| 1         | 29.5                      | 38 37                     | 237 21                    | 120 45                    | -64                       | - 50 +                    | -5.3         | + 10.6       | -  |        |        |                                 |            |   |
| 2         | 29.5                      | 38 6                      | 238 26                    | 119 40                    | -64                       | - 48 +                    | -5.1         | + 11.0       | -  |        |        |                                 |            |   |
| 3         | 29.4                      | 37 35                     | 239 33                    | 118 33                    | -65                       | - 46 +                    | -4.9         | + 11.3       | -  |        |        |                                 |            |   |
| 4         | 29.3                      | 37 6                      | 240 42                    | 117 25                    | -66                       | - 43 +                    | -4.8         | + 11.6       | -  |        |        |                                 |            |   |
| 5         | 29.3                      | 36 38                     | 241 52                    | 116 14                    | -66                       | - 41 +                    | -4.6         | + 12.0       | -  |        |        |                                 |            |   |
| 6         | 29.2                      | 36 12                     | 243 5                     | 115 1                     | -67                       | - 38 +                    | -4.4         | + 12.3       | -  |        |        |                                 |            |   |
| 7         | 29.1                      | 35 46                     | 244 20                    | 113 46                    | -68                       | - 35 +                    | -4.2         | + 12.6       | -  |        |        |                                 |            |   |
| 8         | 29.1                      | 35 21                     | 245 36                    | 112 29                    | -68                       | - 33 +                    | -4.0         | + 12.9       | -  |        |        |                                 |            |   |
| 9         | 29.0                      | 34 58                     | 246 54                    | 111 10                    | -68                       | - 29 +                    | -3.8         | + 13.2       | -  |        |        |                                 |            |   |
| 10        | 28.9                      | 34 36                     | 248 15                    | 109 50                    | -69                       | - 26 +                    | -3.6         | + 13.5       | -  |        |        |                                 |            |   |
| 11        | 28.9                      | 34 16                     | 249 37                    | 108 27                    | -69                       | - 23 +                    | -3.3         | + 13.8       | -  |        |        |                                 |            |   |
| 12        | 28.8                      | 33 56                     | 251 0                     | 107 3                     | -70                       | - 19 +                    | -3.1         | + 14.1       | -  |        |        |                                 |            |   |
| 13        | 28.7                      | 33 38                     | 252 26                    | 105 38                    | -70                       | - 16 +                    | -2.8         | + 14.3       | -  |        |        |                                 |            |   |
| 14        | 28.6                      | 33 22                     | 253 53                    | 104 10                    | -70                       | - 12 +                    | -2.6         | + 14.6       | -  |        |        |                                 |            |   |
| 15        | 28.6                      | 33 7                      | 255 21                    | 102 41                    | -70                       | - 8 +                     | -2.4         | + 14.8       | -  |        |        |                                 |            |   |
| 16        | 28.5                      | 32 54                     | 256 51                    | 101 11                    | -71                       | - 4 +                     | -2.1         | + 15.0       | -  |        |        |                                 |            |   |
| 17        | 28.4                      | 32 42                     | 258 21                    | 99 40                     | -71                       | + 1 -                     | -1.8         | + 15.2       | -  |        |        |                                 |            |   |
| 18        | 28.4                      | 32 32                     | 259 53                    | 98 7                      | -71                       | + 5 -                     | -1.6         | + 15.4       | -  |        |        |                                 |            |   |
| 19        | 28.3                      | 32 23                     | 261 26                    | 96 33                     | -70                       | + 10 -                    | -1.3         | + 15.6       | -  |        |        |                                 |            |   |
| +20       | 16 28.2                   | 32 16                     | 263 0                     | 94 59                     | -70                       | + 14 -                    | -1.1         | + 15.8       | -  |        |        |                                 |            |   |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| + 0       | +0.05      | -0.1       | -0.2         | -0.5         |
| 5         | 0.05       | 0.1        | 0.2          | 0.5          |
| 10        | 0.05       | -0.1       | 0.1          | 0.5          |
| 15        | 0.05       | 0.0        | 0.1          | 0.5          |
| +20       | +0.04      | 0.0        | -0.1         | -0.5         |

DATA REQUIRED FOR OBSERVATION.

|              |   | No. | Star             | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|--------------|---|-----|------------------|------|---------------------------|---------------------------|
|              |   |     |                  |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 138 | E | 159 | $\lambda$ Aquilæ | 3.6  | 19 3.6                    | -4 58                     |
|              | W | 116 | $\iota$ Virginis | 4.2  | 14 13.4                   | -5 46                     |

| $\varphi$ | S                         |                           | z                         |                           | $A_E$                     |                           | $A_W$        |              | dz | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------------|--------------|----|--------|--------|---------------------------------|------------|---|
|           | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>'</sup> | <sup>'</sup> |    |        |        | $\Delta z$                      | $\Delta A$ | E |
| + 0       | 16 38.3                   | 37 14                     | 278 12                    | 80 26                     | -74                       | + 16 -                    | +1.6         | + 13.1       | -  |        |        |                                 |            |   |
| 1         | 38.2                      | 37 24                     | 279 30                    | 79 9                      | -74                       | + 19 -                    | +1.8         | + 12.9       | -  |        |        |                                 |            |   |
| 2         | 38.2                      | 37 35                     | 280 47                    | 77 52                     | -73                       | + 23 -                    | +2.0         | + 12.7       | -  |        |        |                                 |            |   |
| 3         | 38.1                      | 37 48                     | 282 2                     | 76 36                     | -73                       | + 26 -                    | +2.2         | + 12.6       | -  |        |        |                                 |            |   |
| 4         | 38.1                      | 38 2                      | 283 17                    | 75 21                     | -73                       | + 29 -                    | +2.4         | + 12.4       | -  |        |        |                                 |            |   |
| 5         | 38.0                      | 38 17                     | 284 31                    | 74 7                      | -72                       | + 32 -                    | +2.6         | + 12.2       | -  |        |        |                                 |            |   |
| 6         | 38.0                      | 38 33                     | 285 44                    | 72 54                     | -71                       | + 35 -                    | +2.8         | + 12.0       | -  |        |        |                                 |            |   |
| 7         | 37.9                      | 38 51                     | 286 55                    | 71 43                     | -71                       | + 38 -                    | +3.0         | + 11.8       | -  |        |        |                                 |            |   |
| 8         | 37.9                      | 39 9                      | 288 6                     | 70 32                     | -70                       | + 41 -                    | +3.2         | + 11.6       | -  |        |        |                                 |            |   |
| 9         | 37.9                      | 39 29                     | 289 15                    | 69 23                     | -69                       | + 44 -                    | +3.4         | + 11.4       | -  |        |        |                                 |            |   |
| 10        | 37.8                      | 39 50                     | 290 22                    | 68 15                     | -69                       | + 46 -                    | +3.6         | + 11.2       | -  |        |        |                                 |            |   |
| 11        | 37.8                      | 40 12                     | 291 29                    | 67 8                      | -68                       | + 48 -                    | +3.8         | + 10.9       | -  |        |        |                                 |            |   |
| 12        | 37.7                      | 40 35                     | 292 33                    | 66 3                      | -67                       | + 51 -                    | +4.0         | + 10.7       | -  |        |        |                                 |            |   |
| 13        | 37.7                      | 41 0                      | 293 37                    | 65 0                      | -66                       | + 53 -                    | +4.1         | + 10.5       | -  |        |        |                                 |            |   |
| 14        | 37.6                      | 41 25                     | 294 39                    | 63 57                     | -65                       | + 55 -                    | +4.3         | + 10.2       | -  |        |        |                                 |            |   |
| 15        | 37.6                      | 41 51                     | 295 39                    | 62 56                     | -65                       | + 57 -                    | +4.4         | + 10.0       | -  |        |        |                                 |            |   |
| 16        | 37.5                      | 42 18                     | 296 39                    | 61 57                     | -64                       | + 58 -                    | +4.6         | + 9.7        | -  |        |        |                                 |            |   |
| 17        | 37.5                      | 42 46                     | 297 36                    | 60 59                     | -63                       | + 60 -                    | +4.7         | + 9.5        | -  |        |        |                                 |            |   |
| 18        | 37.4                      | 43 15                     | 298 32                    | 60 2                      | -62                       | + 62 -                    | +4.9         | + 9.2        | -  |        |        |                                 |            |   |
| 19        | 37.3                      | 43 45                     | 299 27                    | 59 7                      | -61                       | + 63 -                    | +5.0         | + 9.0        | -  |        |        |                                 |            |   |
| +20       | 16 37.3                   | 44 15                     | 300 20                    | 58 13                     | -60                       | + 64 -                    | +5.2         | + 8.7        | -  |        |        |                                 |            |   |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| + 0       | +0.05      | 0.0        | -0.2         | -0.5         |
| 5         | 0.05       | 0.0        | 0.2          | 0.5          |
| 10        | 0.05       | 0.0        | 0.2          | 0.5          |
| 15        | 0.05       | +0.1       | 0.2          | 0.4          |
| +20       | +0.04      | +0.1       | -0.2         | -0.4         |



TABLE II.

|              | No.   | Star                | Mag. | $\alpha_{1950}$ | $\delta_{1950}$ |
|--------------|-------|---------------------|------|-----------------|-----------------|
| Pair No. 139 | E 171 | $\epsilon$ Delphini | 4.0  | 20 30.8         | +11 8           |
|              | W 107 | $\epsilon$ Virginis | 3.0  | 12 59.7         | +11 14          |

| $\varphi$ | S  |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |   |     |   |
|-----------|----|------|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|---|-----|---|
|           | h  | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | E | W   |   |
| +0        | 16 | 45.2 | 57 | 43 | 256   | 48 | 103   | 19 | -73 | -11    | +      | -2.3                            | + | 6.1 | - |
| 1         |    | 45.2 | 57 | 30 | 257   | 25 | 102   | 42 | -73 | -9     | +      | -2.2                            | + | 6.2 | - |
| 2         |    | 45.3 | 57 | 17 | 258   | 3  | 102   | 4  | -73 | -8     | +      | -2.1                            | + | 6.3 | - |
| 3         |    | 45.3 | 57 | 5  | 258   | 40 | 101   | 26 | -74 | -6     | +      | -2.0                            | + | 6.3 | - |
| 4         |    | 45.3 | 56 | 53 | 259   | 19 | 100   | 48 | -74 | -4     | +      | -1.9                            | + | 6.4 | - |
| 5         |    | 45.3 | 56 | 43 | 259   | 57 | 100   | 10 | -74 | -2     | +      | -1.8                            | + | 6.5 | - |
| 6         |    | 45.3 | 56 | 32 | 260   | 36 | 99    | 31 | -74 | 0      |        | -1.6                            | + | 6.5 | - |
| 7         |    | 45.3 | 56 | 23 | 261   | 16 | 98    | 51 | -74 | +1     | -      | -1.5                            | + | 6.6 | - |
| 8         |    | 45.3 | 56 | 14 | 261   | 55 | 98    | 12 | -73 | +3     | -      | -1.4                            | + | 6.6 | - |
| 9         |    | 45.3 | 56 | 6  | 262   | 35 | 97    | 32 | -73 | +5     | -      | -1.3                            | + | 6.7 | - |
| 10        |    | 45.3 | 55 | 58 | 263   | 15 | 96    | 52 | -73 | +7     | -      | -1.2                            | + | 6.7 | - |
| 11        |    | 45.3 | 55 | 52 | 263   | 56 | 96    | 12 | -73 | +9     | -      | -1.1                            | + | 6.7 | - |
| 12        |    | 45.3 | 55 | 46 | 264   | 36 | 95    | 31 | -73 | +11    | -      | -1.0                            | + | 6.8 | - |
| 13        |    | 45.3 | 55 | 40 | 265   | 17 | 94    | 50 | -73 | +13    | -      | -0.8                            | + | 6.8 | - |
| 14        |    | 45.3 | 55 | 36 | 265   | 58 | 94    | 9  | -73 | +15    | -      | -0.7                            | + | 6.8 | - |
| 15        |    | 45.3 | 55 | 32 | 266   | 39 | 93    | 28 | -72 | +17    | -      | -0.6                            | + | 6.9 | - |
| 16        |    | 45.3 | 55 | 28 | 267   | 20 | 92    | 47 | -72 | +19    | -      | -0.5                            | + | 6.9 | - |
| 17        |    | 45.3 | 55 | 26 | 268   | 1  | 92    | 6  | -72 | +20    | -      | -0.4                            | + | 6.9 | - |
| 18        |    | 45.3 | 55 | 24 | 268   | 43 | 91    | 25 | -71 | +22    | -      | -0.2                            | + | 6.9 | - |
| 19        |    | 45.3 | 55 | 23 | 269   | 24 | 90    | 43 | -71 | +24    | -      | -0.1                            | + | 6.9 | - |
| +20       | 16 | 45.3 | 55 | 23 | 270   | 6  | 90    | 2  | -70 | +26    | -      | 0.0                             | + | 6.9 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| +0        | +0.05      | 0.0        | -0.3         | -0.4         |
| 5         | 0.05       | 0.0        | 0.3          | 0.4          |
| 10        | 0.05       | 0.0        | 0.3          | 0.4          |
| 15        | 0.05       | 0.0        | 0.3          | 0.4          |
| +20       | +0.04      | 0.0        | -0.3         | -0.4         |

DATA REQUIRED FOR OBSERVATION.

|              | No.   | Star             | Mag. | $\alpha_{1950}$ | $\delta_{1950}$ |
|--------------|-------|------------------|------|-----------------|-----------------|
| Pair No. 140 | E 169 | $\theta$ Aquilæ  | 3.4  | 20 8.7          | -0 58           |
|              | W 110 | $\zeta$ Virginis | 3.4  | 13 32.1         | -0 20           |

| $\varphi$ | S  |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |   |     |   |
|-----------|----|------|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|---|-----|---|
|           | h  | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | E | W   |   |
| +0        | 16 | 50.4 | 50 | 12 | 271   | 16 | 89    | 34 | -75 | +1     | -      | +0.2                            | + | 8.3 | - |
| 1         |    | 50.5 | 50 | 14 | 272   | 6  | 88    | 44 | -75 | +3     | -      | +0.3                            | + | 8.3 | - |
| 2         |    | 50.5 | 50 | 16 | 272   | 56 | 87    | 54 | -75 | +6     | -      | +0.4                            | + | 8.3 | - |
| 3         |    | 50.5 | 50 | 19 | 273   | 46 | 87    | 4  | -75 | +8     | -      | +0.6                            | + | 8.3 | - |
| 4         |    | 50.6 | 50 | 23 | 274   | 35 | 86    | 15 | -75 | +10    | -      | +0.7                            | + | 8.3 | - |
| 5         |    | 50.6 | 50 | 28 | 275   | 25 | 85    | 25 | -75 | +12    | -      | +0.9                            | + | 8.2 | - |
| 6         |    | 50.6 | 50 | 33 | 276   | 14 | 84    | 36 | -74 | +14    | -      | +1.0                            | + | 8.2 | - |
| 7         |    | 50.6 | 50 | 40 | 277   | 3  | 83    | 47 | -74 | +17    | -      | +1.2                            | + | 8.2 | - |
| 8         |    | 50.7 | 50 | 47 | 277   | 52 | 82    | 58 | -74 | +19    | -      | +1.3                            | + | 8.1 | - |
| 9         |    | 50.7 | 50 | 55 | 278   | 40 | 82    | 10 | -73 | +21    | -      | +1.4                            | + | 8.1 | - |
| 10        |    | 50.7 | 51 | 4  | 279   | 28 | 81    | 22 | -73 | +23    | -      | +1.6                            | + | 8.0 | - |
| 11        |    | 50.8 | 51 | 14 | 280   | 16 | 80    | 34 | -72 | +25    | -      | +1.7                            | + | 7.9 | - |
| 12        |    | 50.8 | 51 | 25 | 281   | 4  | 79    | 47 | -72 | +27    | -      | +1.8                            | + | 7.9 | - |
| 13        |    | 50.8 | 51 | 36 | 281   | 50 | 79    | 1  | -71 | +29    | -      | +2.0                            | + | 7.8 | - |
| 14        |    | 50.9 | 51 | 48 | 282   | 37 | 78    | 14 | -71 | +31    | -      | +2.1                            | + | 7.7 | - |
| 15        |    | 50.9 | 52 | 1  | 283   | 23 | 77    | 29 | -70 | +33    | -      | +2.2                            | + | 7.6 | - |
| 16        |    | 50.9 | 52 | 15 | 284   | 8  | 76    | 43 | -70 | +34    | -      | +2.4                            | + | 7.5 | - |
| 17        |    | 50.9 | 52 | 30 | 284   | 53 | 75    | 59 | -69 | +36    | -      | +2.5                            | + | 7.5 | - |
| 18        |    | 51.0 | 52 | 45 | 285   | 38 | 75    | 14 | -69 | +38    | -      | +2.6                            | + | 7.4 | - |
| 19        |    | 51.0 | 53 | 1  | 286   | 22 | 74    | 31 | -68 | +40    | -      | +2.8                            | + | 7.3 | - |
| +20       | 16 | 51.0 | 53 | 18 | 287   | 5  | 73    | 48 | -67 | +41    | -      | +2.9                            | + | 7.2 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| +0        | +0.05      | 0.0        | -0.2         | -0.4         |
| 5         | 0.05       | 0.0        | 0.2          | 0.4          |
| 10        | 0.05       | 0.0        | 0.2          | 0.4          |
| 15        | 0.05       | 0.0        | 0.3          | 0.4          |
| +20       | +0.04      | 0.0        | -0.3         | -0.4         |



TABLE II.

|               |   | No. | Star             | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|---------------|---|-----|------------------|------|---------------------------|---------------------------|
|               |   |     |                  |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| P. ir No. 141 | E | 168 | $\gamma$ Sagittæ | 3.7  | 19 56.5                   | +19 21                    |
|               | W | 112 | $\eta$ Bootis    | 2.8  | 13 52.3                   | +18 39                    |

| $\varphi$ | S                         |                           | z                         |                           | $A_E$                     |                           | $A_W$                     |                           | dz | dA <sub>E</sub> | dA <sub>W</sub> | Var. for $\Delta\varphi = +10'$ |            |  |
|-----------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|----|-----------------|-----------------|---------------------------------|------------|--|
|           | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> |    |                 |                 | $\Delta z$                      | $\Delta A$ |  |
| + 0       | 16 54.9                   | 49 5                      | 243 59                    | 115 1                     | -68                       | - 29 +                    | -4.3                      | + 7.8 -                   |    |                 |                 |                                 |            |  |
| 1         | 54.9                      | 48 39                     | 244 46                    | 114 14                    | -68                       | - 27 +                    | -4.2                      | + 8.0 -                   |    |                 |                 |                                 |            |  |
| 2         | 54.8                      | 48 15                     | 245 35                    | 113 26                    | -69                       | - 25 +                    | -4.0                      | + 8.2 -                   |    |                 |                 |                                 |            |  |
| 3         | 54.8                      | 47 51                     | 246 24                    | 112 36                    | -69                       | - 23 +                    | -3.9                      | + 8.3 -                   |    |                 |                 |                                 |            |  |
| 4         | 54.8                      | 47 28                     | 247 15                    | 111 46                    | -69                       | - 21 +                    | -3.8                      | + 8.5 -                   |    |                 |                 |                                 |            |  |
| 5         | 54.7                      | 47 5                      | 248 6                     | 110 54                    | -70                       | - 19 +                    | -3.7                      | + 8.7 -                   |    |                 |                 |                                 |            |  |
| 6         | 54.7                      | 46 44                     | 248 59                    | 110 2                     | -70                       | - 17 +                    | -3.5                      | + 8.8 -                   |    |                 |                 |                                 |            |  |
| 7         | 54.7                      | 46 23                     | 249 52                    | 109 8                     | -70                       | - 15 +                    | -3.4                      | + 9.0 -                   |    |                 |                 |                                 |            |  |
| 8         | 54.6                      | 46 4                      | 250 46                    | 108 14                    | -70                       | - 13 +                    | -3.2                      | + 9.1 -                   |    |                 |                 |                                 |            |  |
| 9         | 54.6                      | 45 45                     | 251 41                    | 107 19                    | -71                       | - 11 +                    | -3.1                      | + 9.3 -                   |    |                 |                 |                                 |            |  |
| 10        | 54.6                      | 45 27                     | 252 37                    | 106 23                    | -71                       | - 9 +                     | -2.9                      | + 9.4 -                   |    |                 |                 |                                 |            |  |
| 11        | 54.5                      | 45 10                     | 253 34                    | 105 25                    | -71                       | - 6 +                     | -2.7                      | + 9.6 -                   |    |                 |                 |                                 |            |  |
| 12        | 54.5                      | 44 54                     | 254 32                    | 104 28                    | -71                       | - 4 +                     | -2.6                      | + 9.7 -                   |    |                 |                 |                                 |            |  |
| 13        | 54.4                      | 44 39                     | 255 30                    | 103 29                    | -71                       | - 1 +                     | -2.4                      | + 9.8 -                   |    |                 |                 |                                 |            |  |
| 14        | 54.4                      | 44 25                     | 256 29                    | 102 30                    | -71                       | + 1 -                     | -2.3                      | + 9.9 -                   |    |                 |                 |                                 |            |  |
| 15        | 54.4                      | 44 12                     | 257 29                    | 101 29                    | -71                       | + 4 -                     | -2.1                      | + 10.0 -                  |    |                 |                 |                                 |            |  |
| 16        | 54.3                      | 44 0                      | 258 30                    | 100 29                    | -71                       | + 6 -                     | -1.9                      | + 10.1 -                  |    |                 |                 |                                 |            |  |
| 17        | 54.3                      | 43 49                     | 259 31                    | 99 27                     | -71                       | + 9 -                     | -1.7                      | + 10.2 -                  |    |                 |                 |                                 |            |  |
| 18        | 54.3                      | 43 39                     | 260 32                    | 98 25                     | -70                       | + 11 -                    | -1.6                      | + 10.3 -                  |    |                 |                 |                                 |            |  |
| 19        | 54.2                      | 43 30                     | 261 34                    | 97 23                     | -70                       | + 14 -                    | -1.4                      | + 10.4 -                  |    |                 |                 |                                 |            |  |
| +20       | 16 54.2                   | 43 23                     | 262 37                    | 96 20                     | -70                       | + 17 -                    | -1.2                      | + 10.5 -                  |    |                 |                 |                                 |            |  |

Annual Precessions of S, z, A<sub>E</sub>, and A<sub>W</sub>.

| $\varphi$    | $\delta S$   | $\delta z$   | $\delta A_E$ | $\delta A_W$ |
|--------------|--------------|--------------|--------------|--------------|
| <sup>°</sup> | <sup>m</sup> | <sup>'</sup> | <sup>'</sup> | <sup>'</sup> |
| + 0          | +0.05        | 0.0          | -0.2         | -0.4         |
| 5            | 0.05         | 0.0          | 0.2          | 0.4          |
| 10           | 0.05         | 0.0          | 0.2          | 0.4          |
| 15           | 0.05         | 0.0          | 0.2          | 0.4          |
| +20          | +0.04        | 0.0          | -0.2         | -0.4         |

DATA REQUIRED FOR OBSERVATION.

|              |   | No. | Star             | Mag. | $\alpha_{1950}$           | $\delta_{1950}$           |
|--------------|---|-----|------------------|------|---------------------------|---------------------------|
|              |   |     |                  |      | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> |
| Pair No. 142 | E | 168 | $\gamma$ Sagittæ | 3.7  | 19 56.5                   | +19 21                    |
|              | W | 115 | $\alpha$ Bootis  | 0.2  | 14 13.4                   | +19 27                    |

| $\varphi$ | S                         |                           | z                         |                           | $A_E$                     |                           | $A_W$                     |                           | dz | dA <sub>E</sub> | dA <sub>W</sub> | Var. for $\Delta\varphi = +10'$ |            |  |
|-----------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|----|-----------------|-----------------|---------------------------------|------------|--|
|           | <sup>h</sup> <sup>m</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> | <sup>°</sup> <sup>'</sup> |    |                 |                 | $\Delta z$                      | $\Delta A$ |  |
| + 0       | 17 4.9                    | 46 51                     | 242 59                    | 117 9                     | -67                       | - 33 +                    | -4.6                      | + 8.3 -                   |    |                 |                 |                                 |            |  |
| 1         | 4.9                       | 46 24                     | 243 50                    | 116 18                    | -67                       | - 31 +                    | -4.4                      | + 8.5 -                   |    |                 |                 |                                 |            |  |
| 2         | 4.9                       | 45 58                     | 244 41                    | 115 26                    | -68                       | - 29 +                    | -4.3                      | + 8.7 -                   |    |                 |                 |                                 |            |  |
| 3         | 4.9                       | 45 32                     | 245 34                    | 114 33                    | -68                       | - 28 +                    | -4.1                      | + 8.9 -                   |    |                 |                 |                                 |            |  |
| 4         | 4.9                       | 45 8                      | 246 29                    | 113 39                    | -69                       | - 26 +                    | -4.0                      | + 9.1 -                   |    |                 |                 |                                 |            |  |
| 5         | 4.9                       | 44 44                     | 247 24                    | 112 44                    | -69                       | - 23 +                    | -3.9                      | + 9.3 -                   |    |                 |                 |                                 |            |  |
| 6         | 4.9                       | 44 22                     | 248 21                    | 111 47                    | -69                       | - 21 +                    | -3.7                      | + 9.5 -                   |    |                 |                 |                                 |            |  |
| 7         | 4.9                       | 44 0                      | 249 18                    | 110 50                    | -70                       | - 19 +                    | -3.6                      | + 9.7 -                   |    |                 |                 |                                 |            |  |
| 8         | 4.9                       | 43 39                     | 250 17                    | 109 51                    | -70                       | - 17 +                    | -3.4                      | + 9.9 -                   |    |                 |                 |                                 |            |  |
| 9         | 4.9                       | 43 19                     | 251 16                    | 108 51                    | -70                       | - 14 +                    | -3.2                      | + 10.0 -                  |    |                 |                 |                                 |            |  |
| 10        | 4.9                       | 43 0                      | 252 17                    | 107 51                    | -70                       | - 12 +                    | -3.1                      | + 10.2 -                  |    |                 |                 |                                 |            |  |
| 11        | 5.0                       | 42 43                     | 253 19                    | 106 49                    | -70                       | - 9 +                     | -2.9                      | + 10.4 -                  |    |                 |                 |                                 |            |  |
| 12        | 5.0                       | 42 26                     | 254 22                    | 105 46                    | -71                       | - 7 +                     | -2.7                      | + 10.5 -                  |    |                 |                 |                                 |            |  |
| 13        | 5.0                       | 42 10                     | 255 25                    | 104 43                    | -71                       | - 4 +                     | -2.5                      | + 10.7 -                  |    |                 |                 |                                 |            |  |
| 14        | 5.0                       | 41 56                     | 256 30                    | 103 38                    | -71                       | - 1 +                     | -2.3                      | + 10.8 -                  |    |                 |                 |                                 |            |  |
| 15        | 5.0                       | 41 42                     | 257 35                    | 102 33                    | -71                       | + 1 -                     | -2.2                      | + 11.0 -                  |    |                 |                 |                                 |            |  |
| 16        | 5.0                       | 41 30                     | 258 41                    | 101 27                    | -71                       | + 4 -                     | -2.0                      | + 11.1 -                  |    |                 |                 |                                 |            |  |
| 17        | 5.0                       | 41 18                     | 259 48                    | 100 20                    | -71                       | + 7 -                     | -1.8                      | + 11.2 -                  |    |                 |                 |                                 |            |  |
| 18        | 5.0                       | 41 8                      | 260 55                    | 99 13                     | -70                       | + 10 -                    | -1.6                      | + 11.3 -                  |    |                 |                 |                                 |            |  |
| 19        | 5.0                       | 40 59                     | 262 3                     | 98 5                      | -70                       | + 13 -                    | -1.4                      | + 11.4 -                  |    |                 |                 |                                 |            |  |
| +20       | 17 5.0                    | 40 52                     | 263 12                    | 96 56                     | -70                       | + 16 -                    | -1.2                      | + 11.5 -                  |    |                 |                 |                                 |            |  |

Annual Precessions of S, z, A<sub>E</sub>, and A<sub>W</sub>.

| $\varphi$    | $\delta S$   | $\delta z$   | $\delta A_E$ | $\delta A_W$ |
|--------------|--------------|--------------|--------------|--------------|
| <sup>°</sup> | <sup>m</sup> | <sup>'</sup> | <sup>'</sup> | <sup>'</sup> |
| + 0          | +0.05        | 0.0          | -0.3         | -0.4         |
| 5            | 0.05         | 0.0          | 0.3          | 0.4          |
| 10           | 0.05         | 0.0          | 0.3          | 0.4          |
| 15           | 0.05         | 0.0          | 0.3          | 0.4          |
| +20          | +0.04        | 0.0          | -0.3         | -0.4         |



TABLE II.

Pair No. 143  
 E 176 ζ Capric. 3.9 21 23.8 -22 38  
 W 108 γ Hydræ 3.3 13 16.2 -22 55

| φ   | S  |      | z  |    | A <sub>E</sub> |    | A <sub>W</sub> |    | dz  | dA <sub>E</sub> | dA <sub>W</sub> | Var. for Δφ = +10' |                 |                 |
|-----|----|------|----|----|----------------|----|----------------|----|-----|-----------------|-----------------|--------------------|-----------------|-----------------|
|     | h  | m    | °  | '  | °              | '  | °              | '  |     |                 |                 | Δz                 | ΔA <sub>E</sub> | ΔA <sub>W</sub> |
| +0  | 17 | 19.9 | 63 | 58 | 295            | 21 | 64             | 20 | -68 | +16             | -               | +4.3               | +4.4            | -               |
| 1   |    | 19.9 | 64 | 24 | 295            | 47 | 63             | 54 | -67 | +18             | -               | +4.4               | +4.3            | -               |
| 2   |    | 19.9 | 64 | 51 | 296            | 13 | 63             | 28 | -67 | +19             | -               | +4.4               | +4.2            | -               |
| 3   |    | 19.8 | 65 | 17 | 296            | 38 | 63             | 3  | -67 | +20             | -               | +4.5               | +4.1            | -               |
| 4   |    | 19.8 | 65 | 45 | 297            | 2  | 62             | 39 | -67 | +21             | -               | +4.6               | +4.0            | -               |
| 5   |    | 19.8 | 66 | 12 | 297            | 26 | 62             | 15 | -66 | +22             | -               | +4.6               | +3.9            | -               |
| 6   |    | 19.8 | 66 | 40 | 297            | 49 | 61             | 52 | -66 | +24             | -               | +4.7               | +3.8            | -               |
| 7   |    | 19.8 | 67 | 9  | 298            | 12 | 61             | 29 | -66 | +25             | -               | +4.7               | +3.7            | -               |
| 8   |    | 19.8 | 67 | 37 | 298            | 33 | 61             | 7  | -65 | +26             | -               | +4.8               | +3.6            | -               |
| 9   |    | 19.8 | 68 | 6  | 298            | 55 | 60             | 46 | -65 | +27             | -               | +4.9               | +3.5            | -               |
| 10  |    | 19.8 | 68 | 35 | 299            | 16 | 60             | 25 | -64 | +28             | -               | +4.9               | +3.4            | -               |
| 11  |    | 19.8 | 69 | 5  | 299            | 36 | 60             | 5  | -64 | +29             | -               | +5.0               | +3.3            | -               |
| 12  |    | 19.8 | 69 | 35 | 299            | 55 | 59             | 45 | -63 | +30             | -               | +5.0               | +3.2            | -               |
| 13  |    | 19.7 | 70 | 5  | 300            | 14 | 59             | 26 | -63 | +31             | -               | +5.1               | +3.1            | -               |
| 14  |    | 19.7 | 70 | 36 | 300            | 33 | 59             | 8  | -62 | +32             | -               | +5.1               | +3.0            | -               |
| 15  |    | 19.7 | 71 | 6  | 300            | 51 | 58             | 50 | -62 | +33             | -               | +5.2               | +2.9            | -               |
| 16  |    | 19.7 | 71 | 38 | 301            | 8  | 58             | 32 | -61 | +34             | -               | +5.2               | +2.8            | -               |
| 17  |    | 19.7 | 72 | 9  | 301            | 24 | 58             | 16 | -61 | +34             | -               | +5.2               | +2.7            | -               |
| 18  |    | 19.7 | 72 | 40 | 301            | 41 | 57             | 59 | -60 | +35             | -               | +5.3               | +2.6            | -               |
| 19  |    | 19.7 | 73 | 12 | 301            | 56 | 57             | 44 | -60 | +36             | -               | +5.3               | +2.6            | -               |
| +20 | 17 | 19.7 | 73 | 44 | 302            | 11 | 57             | 29 | -59 | +37             | -               | +5.4               | +2.5            | -               |

Annual recessions of S, z, A<sub>E</sub> and A<sub>W</sub>.

| φ   | δS    | δz  | δA <sub>E</sub> | δA <sub>W</sub> |
|-----|-------|-----|-----------------|-----------------|
| +0  | m     | '   | '               | '               |
| +0  | +0.05 | 0.0 | -0.3            | -0.4            |
| 5   | 0.05  | 0.0 | 0.3             | 0.4             |
| 10  | 0.05  | 0.0 | 0.3             | 0.4             |
| 15  | 0.05  | 0.0 | 0.3             | 0.4             |
| +20 | +0.04 | 0.0 | -0.3            | -0.4            |

Pair No. 144  
 E 170 β Capric 3.3 20 18.2 -14 56  
 W 120 α<sup>2</sup> Libræ 2.9 14 48.1 -15 50

| φ   | S  |      | z  |    | A <sub>E</sub> |    | A <sub>W</sub> |    | dz  | dA <sub>E</sub> | dA <sub>W</sub> | Var. for Δφ = +10' |                 |                 |
|-----|----|------|----|----|----------------|----|----------------|----|-----|-----------------|-----------------|--------------------|-----------------|-----------------|
|     | h  | m    | °  | '  | °              | '  | °              | '  |     |                 |                 | Δz                 | ΔA <sub>E</sub> | ΔA <sub>W</sub> |
| +0  | 17 | 32.6 | 44 | 8  | 291            | 43 | 66             | 55 | -69 | +30             | -               | +3.8               | +9.5            | -               |
| 1   |    | 32.6 | 44 | 31 | 292            | 40 | 65             | 59 | -69 | +33             | -               | +4.0               | +9.3            | -               |
| 2   |    | 32.5 | 44 | 55 | 293            | 35 | 65             | 3  | -68 | +35             | -               | +4.1               | +9.1            | -               |
| 3   |    | 32.5 | 45 | 20 | 294            | 29 | 64             | 9  | -68 | +37             | -               | +4.3               | +8.9            | -               |
| 4   |    | 32.4 | 45 | 46 | 295            | 22 | 63             | 16 | -67 | +38             | -               | +4.4               | +8.7            | -               |
| 5   |    | 32.4 | 46 | 13 | 296            | 14 | 62             | 24 | -66 | +40             | -               | +4.5               | +8.5            | -               |
| 6   |    | 32.3 | 46 | 41 | 297            | 5  | 61             | 33 | -66 | +42             | -               | +4.7               | +8.3            | -               |
| 7   |    | 32.3 | 47 | 9  | 297            | 54 | 60             | 44 | -65 | +43             | -               | +4.8               | +8.1            | -               |
| 8   |    | 32.2 | 47 | 38 | 298            | 42 | 59             | 55 | -64 | +45             | -               | +4.9               | +7.9            | -               |
| 9   |    | 32.2 | 48 | 8  | 299            | 29 | 59             | 8  | -64 | +46             | -               | +5.0               | +7.7            | -               |
| 10  |    | 32.1 | 48 | 38 | 300            | 15 | 58             | 22 | -63 | +47             | -               | +5.1               | +7.5            | -               |
| 11  |    | 32.1 | 49 | 10 | 301            | 0  | 57             | 37 | -62 | +49             | -               | +5.3               | +7.3            | -               |
| 12  |    | 32.0 | 49 | 41 | 301            | 43 | 56             | 54 | -62 | +50             | -               | +5.4               | +7.1            | -               |
| 13  |    | 32.0 | 50 | 14 | 302            | 25 | 56             | 11 | -61 | +51             | -               | +5.5               | +6.9            | -               |
| 14  |    | 31.9 | 50 | 47 | 303            | 7  | 55             | 30 | -60 | +52             | -               | +5.6               | +6.8            | -               |
| 15  |    | 31.9 | 51 | 21 | 303            | 46 | 54             | 49 | -59 | +53             | -               | +5.7               | +6.6            | -               |
| 16  |    | 31.8 | 51 | 55 | 304            | 25 | 54             | 10 | -59 | +54             | -               | +5.8               | +6.4            | -               |
| 17  |    | 31.8 | 52 | 30 | 305            | 3  | 53             | 32 | -58 | +55             | -               | +5.8               | +6.2            | -               |
| 18  |    | 31.7 | 53 | 5  | 305            | 40 | 52             | 55 | -57 | +56             | -               | +5.9               | +6.0            | -               |
| 19  |    | 31.7 | 53 | 41 | 306            | 15 | 52             | 19 | -56 | +57             | -               | +6.0               | +5.8            | -               |
| +20 | 17 | 31.6 | 54 | 17 | 306            | 50 | 51             | 44 | -55 | +57             | -               | +6.1               | +5.7            | -               |

Annual Precessions of S, z, A<sub>E</sub> and A<sub>W</sub>.

| φ   | δS    | δz  | δA <sub>E</sub> | δA <sub>W</sub> |
|-----|-------|-----|-----------------|-----------------|
| +0  | m     | '   | '               | '               |
| +0  | +0.05 | 0.0 | -0.3            | -0.4            |
| 5   | 0.05  | 0.0 | 0.3             | 0.4             |
| 10  | 0.05  | 0.0 | 0.3             | 0.4             |
| 15  | 0.05  | 0.0 | 0.3             | 0.4             |
| +20 | +0.04 | 0.0 | -0.3            | -0.4            |



TABLE II.

|              |  | No. | Star | Mag.               | $\alpha_{1950}$ | $\delta_{1950}$ |        |
|--------------|--|-----|------|--------------------|-----------------|-----------------|--------|
|              |  | E   | 164  | $\delta$ Sagittæ   | 3.8             | 19 45.2         | +18 25 |
| Pair No. 145 |  | W   | 128  | $\kappa$ Serpentis | 4.3             | 15 46.5         | +18 18 |

| $\varphi$ | S  |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |        |   |
|-----------|----|------|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------------|--------|---|
|           | h  | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | $\Delta A$ | E      | W |
| +0        | 17 | 46.0 | 35 | 6  | 236   | 42 | 123   | 5  | -62 | -      | 60     | +                               | -5.5       | + 11.9 | - |
| 1         |    | 45.9 | 34 | 34 | 237   | 54 | 121   | 52 | -63 | -      | 58     | +                               | -5.3       | + 12.3 | - |
| 2         |    | 45.9 | 34 | 2  | 239   | 9  | 120   | 37 | -64 | -      | 56     | +                               | -5.1       | + 12.7 | - |
| 3         |    | 45.9 | 33 | 32 | 240   | 27 | 119   | 20 | -65 | -      | 54     | +                               | -4.9       | + 13.1 | - |
| 4         |    | 45.9 | 33 | 4  | 241   | 47 | 117   | 59 | -66 | -      | 51     | +                               | -4.7       | + 13.6 | - |
| 5         |    | 45.9 | 32 | 36 | 243   | 10 | 116   | 37 | -67 | -      | 48     | +                               | -4.5       | + 14.0 | - |
| 6         |    | 45.9 | 32 | 9  | 244   | 35 | 115   | 11 | -67 | -      | 45     | +                               | -4.3       | + 14.4 | - |
| 7         |    | 45.9 | 31 | 45 | 246   | 2  | 113   | 44 | -68 | -      | 41     | +                               | -4.0       | + 14.8 | - |
| 8         |    | 45.9 | 31 | 21 | 247   | 32 | 112   | 14 | -69 | -      | 38     | +                               | -3.8       | + 15.2 | - |
| 9         |    | 45.9 | 30 | 59 | 249   | 4  | 110   | 42 | -69 | -      | 34     | +                               | -3.6       | + 15.5 | - |
| 10        |    | 45.9 | 30 | 38 | 250   | 39 | 109   | 8  | -70 | -      | 30     | +                               | -3.3       | + 16.0 | - |
| 11        |    | 45.9 | 30 | 19 | 252   | 16 | 107   | 31 | -70 | -      | 25     | +                               | -3.0       | + 16.3 | - |
| 12        |    | 45.9 | 30 | 2  | 253   | 54 | 105   | 52 | -70 | -      | 21     | +                               | -2.8       | + 16.6 | - |
| 13        |    | 45.9 | 29 | 46 | 255   | 35 | 104   | 11 | -71 | -      | 16     | +                               | -2.5       | + 16.9 | - |
| 14        |    | 45.8 | 29 | 32 | 257   | 17 | 102   | 29 | -71 | -      | 11     | +                               | -2.2       | + 17.2 | - |
| 15        |    | 45.8 | 29 | 20 | 259   | 1  | 100   | 45 | -71 | -      | 6      | +                               | -1.9       | + 17.5 | - |
| 16        |    | 45.8 | 29 | 10 | 260   | 46 | 98    | 59 | -71 | -      | 0      | -                               | -1.6       | + 17.7 | - |
| 17        |    | 45.8 | 29 | 1  | 262   | 33 | 97    | 13 | -71 | +      | 5      | -                               | -1.3       | + 17.8 | - |
| 18        |    | 45.8 | 28 | 54 | 264   | 20 | 95    | 25 | -71 | +      | 11     | -                               | -1.0       | + 18.0 | - |
| 19        |    | 45.8 | 28 | 50 | 266   | 9  | 93    | 37 | -71 | +      | 16     | -                               | -0.7       | + 18.2 | - |
| +20       | 17 | 45.8 | 28 | 47 | 267   | 58 | 91    | 47 | -70 | +      | 22     | -                               | -0.3       | + 18.3 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| °         | m          | '          | '            | '            |
| +0        | +0.05      | 0.0        | -0.3         | -0.4         |
| 5         | 0.05       | 0.0        | 0.3          | 0.4          |
| 10        | 0.05       | 0.0        | 0.3          | 0.4          |
| 15        | 0.05       | 0.0        | 0.3          | 0.4          |
| +20       | +0.04      | 0.0        | -0.3         | -0.4         |

DATA REQUIRED FOR OBSERVATION.

|              |  | No. | Star | Mag.             | $\alpha_{1950}$ | $\delta_{1950}$ |       |
|--------------|--|-----|------|------------------|-----------------|-----------------|-------|
|              |  | E   | 180  | $\alpha$ Aquarii | 3.2             | 22 3.2          | -0 34 |
| Pair No. 146 |  | W   | 110  | $\zeta$ Virginis | 3.4             | 13 32.1         | -0 20 |

| $\varphi$ | S  |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |       |   |
|-----------|----|------|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------------|-------|---|
|           | h  | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | $\Delta A$ | E     | W |
| +0        | 17 | 47.7 | 64 | 31 | 270   | 37 | 89    | 37 | -75 | -      | 0      | -                               | +0.1       | + 4.8 | - |
| 1         |    | 47.7 | 64 | 31 | 271   | 6  | 89    | 9  | -75 | +      | 2      | -                               | +0.2       | + 4.8 | - |
| 2         |    | 47.7 | 64 | 33 | 271   | 35 | 88    | 40 | -75 | +      | 4      | -                               | +0.3       | + 4.8 | - |
| 3         |    | 47.7 | 64 | 35 | 272   | 3  | 88    | 12 | -75 | +      | 5      | -                               | +0.3       | + 4.8 | - |
| 4         |    | 47.7 | 64 | 37 | 272   | 32 | 87    | 43 | -75 | +      | 7      | -                               | +0.4       | + 4.7 | - |
| 5         |    | 47.7 | 64 | 40 | 273   | 0  | 87    | 15 | -75 | +      | 8      | -                               | +0.5       | + 4.7 | - |
| 6         |    | 47.7 | 64 | 43 | 273   | 28 | 86    | 46 | -75 | +      | 10     | -                               | +0.6       | + 4.7 | - |
| 7         |    | 47.7 | 64 | 47 | 273   | 57 | 86    | 18 | -74 | +      | 12     | -                               | +0.7       | + 4.7 | - |
| 8         |    | 47.8 | 64 | 51 | 274   | 25 | 85    | 50 | -74 | +      | 13     | -                               | +0.7       | + 4.7 | - |
| 9         |    | 47.8 | 64 | 55 | 274   | 53 | 85    | 22 | -74 | +      | 15     | -                               | +0.8       | + 4.7 | - |
| 10        |    | 47.8 | 65 | 1  | 275   | 21 | 84    | 54 | -73 | +      | 16     | -                               | +0.9       | + 4.6 | - |
| 11        |    | 47.8 | 65 | 6  | 275   | 49 | 84    | 27 | -73 | +      | 18     | -                               | +1.0       | + 4.6 | - |
| 12        |    | 47.8 | 65 | 13 | 276   | 16 | 83    | 59 | -73 | +      | 20     | -                               | +1.1       | + 4.6 | - |
| 13        |    | 47.8 | 65 | 19 | 276   | 44 | 83    | 32 | -73 | +      | 21     | -                               | +1.1       | + 4.6 | - |
| 14        |    | 47.8 | 65 | 26 | 277   | 11 | 83    | 4  | -72 | +      | 23     | -                               | +1.2       | + 4.5 | - |
| 15        |    | 47.8 | 65 | 34 | 277   | 38 | 82    | 37 | -72 | +      | 24     | -                               | +1.3       | + 4.5 | - |
| 16        |    | 47.8 | 65 | 42 | 278   | 5  | 82    | 10 | -71 | +      | 26     | -                               | +1.4       | + 4.5 | - |
| 17        |    | 47.8 | 65 | 51 | 278   | 32 | 81    | 44 | -71 | +      | 27     | -                               | +1.5       | + 4.4 | - |
| 18        |    | 47.8 | 66 | 0  | 278   | 59 | 81    | 17 | -71 | +      | 28     | -                               | +1.5       | + 4.4 | - |
| 19        |    | 47.9 | 66 | 9  | 279   | 25 | 80    | 51 | -70 | +      | 30     | -                               | +1.6       | + 4.4 | - |
| +20       | 17 | 47.9 | 66 | 19 | 279   | 51 | 80    | 25 | -69 | +      | 31     | -                               | +1.7       | + 4.3 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| °         | m          | '          | '            | '            |
| +0        | +0.05      | 0.0        | -0.3         | -0.3         |
| 5         | 0.05       | 0.0        | 0.3          | 0.3          |
| 10        | 0.05       | 0.0        | 0.3          | 0.4          |
| 15        | 0.05       | 0.0        | 0.3          | 0.4          |
| +20       | +0.04      | 0.0        | -0.3         | -0.4         |



TABLE II.

|              | No.   | Star             | Mag. | $\alpha_{1950}$                   | $\delta_{1950}$     |
|--------------|-------|------------------|------|-----------------------------------|---------------------|
| Pair No. 147 | E 177 | $\beta$ Aquarii  | 3.1  | 21 <sup>h</sup> 28.9 <sup>m</sup> | -5 <sup>o</sup> 48' |
|              | W 116 | $\iota$ Virginis | 4.2  | 14 13.4                           | -5 46               |

| $\phi$ | S       | z     | $A_E$  | $A_W$ | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |            |   |
|--------|---------|-------|--------|-------|-----|--------|--------|------------------------------|------------|---|
|        |         |       |        |       |     |        |        | $\Delta z$                   | $\Delta A$ |   |
| +0     | 17 51.2 | 55 16 | 277 3  | 82 59 | -74 | + 7    | -      | +1.2                         | + 6.9      | - |
| 1      | 51.2    | 55 24 | 277 44 | 82 18 | -74 | + 9    | -      | +1.3                         | + 6.8      | - |
| 2      | 51.2    | 55 32 | 278 25 | 81 37 | -74 | + 11   | -      | +1.5                         | + 6.8      | - |
| 3      | 51.2    | 55 42 | 279 6  | 80 56 | -74 | + 12   | -      | +1.6                         | + 6.7      | - |
| 4      | 51.2    | 55 51 | 279 46 | 80 16 | -74 | + 14   | -      | +1.7                         | + 6.7      | - |
| 5      | 51.2    | 56 2  | 280 26 | 79 36 | -74 | + 16   | -      | +1.8                         | + 6.6      | - |
| 6      | 51.2    | 56 13 | 281 6  | 78 57 | -73 | + 18   | -      | +1.9                         | + 6.6      | - |
| 7      | 51.2    | 56 25 | 281 45 | 78 17 | -73 | + 20   | -      | +2.0                         | + 6.5      | - |
| 8      | 51.2    | 56 37 | 282 24 | 77 39 | -73 | + 21   | -      | +2.1                         | + 6.4      | - |
| 9      | 51.2    | 56 51 | 283 2  | 77 0  | -72 | + 23   | -      | +2.3                         | + 6.4      | - |
| 10     | 51.2    | 57 4  | 283 40 | 76 22 | -72 | + 25   | -      | +2.4                         | + 6.3      | - |
| 11     | 51.2    | 57 19 | 284 18 | 75 45 | -71 | + 26   | -      | +2.5                         | + 6.2      | - |
| 12     | 51.2    | 57 34 | 284 55 | 75 8  | -71 | + 28   | -      | +2.6                         | + 6.1      | - |
| 13     | 51.2    | 57 50 | 285 31 | 74 31 | -70 | + 30   | -      | +2.7                         | + 6.1      | - |
| 14     | 51.2    | 58 6  | 286 7  | 73 55 | -70 | + 31   | -      | +2.8                         | + 6.0      | - |
| 15     | 51.2    | 58 23 | 286 43 | 73 19 | -69 | + 33   | -      | +2.9                         | + 5.9      | - |
| 16     | 51.2    | 58 41 | 287 18 | 72 44 | -69 | + 34   | -      | +3.0                         | + 5.8      | - |
| 17     | 51.2    | 58 59 | 287 53 | 72 10 | -68 | + 36   | -      | +3.1                         | + 5.7      | - |
| 18     | 51.2    | 59 17 | 288 27 | 71 36 | -68 | + 37   | -      | +3.2                         | + 5.6      | - |
| 19     | 51.2    | 59 37 | 289 0  | 71 2  | -67 | + 39   | -      | +3.3                         | + 5.6      | - |
| +20    | 17 51.2 | 59 56 | 289 33 | 70 29 | -66 | + 40   | -      | +3.3                         | + 5.5      | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| 0      | m          | l          | l            | l            |
| +0     | +0.05      | 0.0        | -0.3         | -0.3         |
| 5      | 0.05       | 0.0        | 0.3          | 0.3          |
| 10     | 0.05       | 0.0        | 0.3          | 0.4          |
| 15     | 0.05       | 0.0        | 0.3          | 0.4          |
| +20    | +0.04      | 0.0        | -0.3         | -0.4         |

DATA REQUIRED FOR OBSERVATION.

|              | No.   | Star               | Mag. | $\alpha_{1950}$                   | $\delta_{1950}$     |
|--------------|-------|--------------------|------|-----------------------------------|---------------------|
| Pair No. 148 | E 174 | $\epsilon$ Aquarii | 3.8  | 20 <sup>h</sup> 45.0 <sup>m</sup> | -9 <sup>o</sup> 41' |
|              | W 123 | $\beta$ Librae     | 2.7  | 15 14.3                           | -9 12               |

| $\phi$ | S       | z     | $A_E$  | $A_W$ | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |            |   |
|--------|---------|-------|--------|-------|-----|--------|--------|------------------------------|------------|---|
|        |         |       |        |       |     |        |        | $\Delta z$                   | $\Delta A$ |   |
| +0     | 17 59.8 | 42 49 | 284 20 | 76 24 | -73 | + 20   | -      | +2.4                         | + 10.5     | - |
| 1      | 59.9    | 43 4  | 285 22 | 75 21 | -73 | + 23   | -      | +2.6                         | + 10.4     | - |
| 2      | 59.9    | 43 20 | 286 24 | 74 20 | -72 | + 25   | -      | +2.8                         | + 10.2     | - |
| 3      | 59.9    | 43 37 | 287 24 | 73 19 | -72 | + 28   | -      | +2.9                         | + 10.0     | - |
| 4      | 17 59.9 | 43 55 | 288 24 | 72 20 | -71 | + 30   | -      | +3.1                         | + 9.9      | - |
| 5      | 18 0.0  | 44 14 | 289 23 | 71 21 | -71 | + 32   | -      | +3.3                         | + 9.7      | - |
| 6      | 0.0     | 44 34 | 290 21 | 70 23 | -70 | + 35   | -      | +3.4                         | + 9.5      | - |
| 7      | 0.0     | 44 55 | 291 17 | 69 27 | -69 | + 37   | -      | +3.6                         | + 9.4      | - |
| 8      | 0.0     | 45 17 | 292 13 | 68 31 | -69 | + 39   | -      | +3.7                         | + 9.2      | - |
| 9      | 0.1     | 45 40 | 293 8  | 67 37 | -68 | + 41   | -      | +3.9                         | + 9.0      | - |
| 10     | 0.1     | 46 3  | 294 1  | 66 43 | -67 | + 43   | -      | +4.0                         | + 8.8      | - |
| 11     | 0.1     | 46 28 | 294 54 | 65 51 | -67 | + 44   | -      | +4.2                         | + 8.7      | - |
| 12     | 0.1     | 46 53 | 295 45 | 65 0  | -66 | + 46   | -      | +4.3                         | + 8.5      | - |
| 13     | 0.2     | 47 19 | 296 35 | 64 9  | -65 | + 48   | -      | +4.4                         | + 8.3      | - |
| 14     | 0.2     | 47 46 | 297 25 | 63 20 | -65 | + 49   | -      | +4.6                         | + 8.1      | - |
| 15     | 0.2     | 48 14 | 298 13 | 62 33 | -64 | + 51   | -      | +4.7                         | + 7.9      | - |
| 16     | 0.2     | 48 42 | 299 0  | 61 46 | -63 | + 52   | -      | +4.8                         | + 7.7      | - |
| 17     | 0.3     | 49 11 | 299 45 | 61 0  | -62 | + 53   | -      | +4.9                         | + 7.6      | - |
| 18     | 0.3     | 49 41 | 300 30 | 60 16 | -61 | + 54   | -      | +5.0                         | + 7.4      | - |
| 19     | 0.3     | 50 11 | 301 14 | 59 32 | -61 | + 56   | -      | +5.1                         | + 7.2      | - |
| +20    | 18 0.4  | 50 43 | 301 56 | 58 50 | -60 | + 57   | -      | +5.2                         | + 7.0      | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| 0      | m          | l          | l            | l            |
| +0     | +0.05      | 0.0        | -0.3         | -0.3         |
| 5      | 0.05       | 0.0        | 0.3          | 0.3          |
| 10     | 0.05       | 0.0        | 0.3          | 0.3          |
| 15     | 0.05       | 0.0        | 0.3          | 0.3          |
| +20    | +0.04      | 0.0        | -0.4         | -0.4         |



TABLE II.

|              | No.   | Star            | Mag. | $\alpha_{1950}$                 | $\delta_{1950}$  |
|--------------|-------|-----------------|------|---------------------------------|------------------|
| Pair No. 149 | E 177 | $\beta$ Aquarii | 3.1  | $21^{\text{h}} 28.9^{\text{m}}$ | $-5^{\circ} 48'$ |
|              | W 118 | $\mu$ Virginis  | 4.0  | $14^{\text{h}} 40.4^{\text{m}}$ | $-5^{\circ} 27'$ |

| $\varphi$ | S  |     | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|----|-----|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------------|---|
|           | h  | m   | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | $\Delta A$ | E |
| +0        | 18 | 4.7 | 51 | 54 | 277   | 22 | 83    | 5  | -74 | +8     | -      | +1.3                            | +7.8       | - |
| 1         |    | 4.8 | 52 | 2  | 278   | 9  | 82    | 18 | -74 | +10    | -      | +1.4                            | +7.7       | - |
| 2         |    | 4.8 | 52 | 11 | 278   | 55 | 81    | 32 | -74 | +12    | -      | +1.5                            | +7.7       | - |
| 3         |    | 4.8 | 52 | 20 | 279   | 41 | 80    | 47 | -74 | +14    | -      | +1.6                            | +7.6       | - |
| 4         |    | 4.8 | 52 | 31 | 280   | 26 | 80    | 1  | -74 | +16    | -      | +1.8                            | +7.6       | - |
| 5         |    | 4.8 | 52 | 42 | 281   | 11 | 79    | 16 | -73 | +18    | -      | +1.9                            | +7.5       | - |
| 6         |    | 4.8 | 52 | 53 | 281   | 56 | 78    | 31 | -73 | +20    | -      | +2.0                            | +7.4       | - |
| 7         |    | 4.9 | 53 | 6  | 282   | 40 | 77    | 47 | -73 | +22    | -      | +2.2                            | +7.3       | - |
| 8         |    | 4.9 | 53 | 19 | 283   | 24 | 77    | 3  | -72 | +23    | -      | +2.3                            | +7.3       | - |
| 9         |    | 4.9 | 53 | 33 | 284   | 7  | 76    | 20 | -72 | +25    | -      | +2.4                            | +7.2       | - |
| 10        |    | 4.9 | 53 | 48 | 284   | 50 | 75    | 37 | -71 | +27    | -      | +2.5                            | +7.1       | - |
| 11        |    | 4.9 | 54 | 4  | 285   | 32 | 74    | 55 | -71 | +29    | -      | +2.6                            | +7.0       | - |
| 12        |    | 4.9 | 54 | 20 | 286   | 14 | 74    | 14 | -70 | +31    | -      | +2.8                            | +6.9       | - |
| 13        |    | 5.0 | 54 | 37 | 286   | 55 | 73    | 33 | -70 | +32    | -      | +2.9                            | +6.8       | - |
| 14        |    | 5.0 | 54 | 54 | 287   | 36 | 72    | 52 | -69 | +34    | -      | +3.0                            | +6.7       | - |
| 15        |    | 5.0 | 55 | 12 | 288   | 16 | 72    | 12 | -69 | +36    | -      | +3.1                            | +6.6       | - |
| 16        |    | 5.0 | 55 | 31 | 288   | 55 | 71    | 33 | -68 | +37    | -      | +3.2                            | +6.5       | - |
| 17        |    | 5.0 | 55 | 51 | 289   | 34 | 70    | 54 | -68 | +39    | -      | +3.3                            | +6.4       | - |
| 18        |    | 5.0 | 56 | 11 | 290   | 12 | 70    | 16 | -67 | +40    | -      | +3.4                            | +6.3       | - |
| 19        |    | 5.1 | 56 | 32 | 290   | 50 | 69    | 39 | -66 | +42    | -      | +3.5                            | +6.2       | - |
| +20       | 18 | 5.1 | 56 | 53 | 291   | 27 | 69    | 2  | -65 | +43    | -      | +3.6                            | +6.1       | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| +0        | +0.05      | 0.0        | -0.3         | -0.3         |
| 5         | 0.05       | 0.0        | 0.3          | 0.3          |
| 10        | 0.05       | 0.0        | 0.4          | 0.3          |
| 15        | 0.05       | 0.0        | 0.3          | 0.3          |
| +20       | +0.04      | 0.0        | -0.4         | -0.4         |

DATA REQUIRED FOR OBSERVATION.

|              | No.   | Star              | Mag. | $\alpha_{1950}$                 | $\delta_{1950}$   |
|--------------|-------|-------------------|------|---------------------------------|-------------------|
| Pair No. 150 | E 173 | $\alpha$ Delphini | 3.9  | $20^{\text{h}} 37.3^{\text{m}}$ | $+15^{\circ} 44'$ |
|              | W 127 | $\beta$ Serpentis | 3.7  | $15^{\text{h}} 43.9^{\text{m}}$ | $+15^{\circ} 35'$ |

| $\varphi$ | S  |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|----|------|----|----|-------|----|-------|----|-----|--------|--------|---------------------------------|------------|---|
|           | h  | m    | °  | '  | °     | '  | °     | '  |     |        |        | $\Delta z$                      | $\Delta A$ | E |
| +0        | 18 | 10.7 | 40 | 1  | 245   | 2  | 114   | 41 | -68 | -      | +      | -4.2                            | +10.8      | - |
| 1         |    | 10.7 | 39 | 36 | 246   | 8  | 113   | 35 | -69 | -      | +      | -4.0                            | +11.1      | - |
| 2         |    | 10.7 | 39 | 12 | 247   | 16 | 112   | 28 | -69 | -      | +      | -3.8                            | +11.3      | - |
| 3         |    | 10.7 | 38 | 50 | 248   | 24 | 111   | 20 | -70 | -      | +      | -3.7                            | +11.6      | - |
| 4         |    | 10.7 | 38 | 29 | 249   | 35 | 110   | 10 | -70 | -      | +      | -3.5                            | +11.8      | - |
| 5         |    | 10.7 | 38 | 8  | 250   | 46 | 108   | 58 | -71 | -      | +      | -3.3                            | +12.1      | - |
| 6         |    | 10.7 | 37 | 49 | 251   | 59 | 107   | 45 | -71 | -      | +      | -3.1                            | +12.3      | - |
| 7         |    | 10.7 | 37 | 31 | 253   | 14 | 106   | 31 | -71 | -      | +      | -2.9                            | +12.5      | - |
| 8         |    | 10.7 | 37 | 15 | 254   | 29 | 105   | 15 | -72 | -      | +      | -2.7                            | +12.7      | - |
| 9         |    | 10.6 | 37 | 0  | 255   | 46 | 103   | 59 | -72 | -      | +      | -2.4                            | +12.9      | - |
| 10        |    | 10.6 | 36 | 46 | 257   | 3  | 102   | 41 | -72 | -      | +      | -2.2                            | +13.1      | - |
| 11        |    | 10.6 | 36 | 33 | 258   | 22 | 101   | 22 | -72 | -      | +      | -2.0                            | +13.2      | - |
| 12        |    | 10.6 | 36 | 22 | 259   | 42 | 100   | 2  | -72 | -      | +      | -1.8                            | +13.3      | - |
| 13        |    | 10.6 | 36 | 12 | 261   | 2  | 98    | 42 | -72 | +      | -      | -1.5                            | +13.5      | - |
| 14        |    | 10.6 | 36 | 3  | 262   | 23 | 97    | 20 | -72 | +      | -      | -1.3                            | +13.6      | - |
| 15        |    | 10.6 | 35 | 56 | 263   | 45 | 95    | 58 | -72 | +      | -      | -1.1                            | +13.7      | - |
| 16        |    | 10.6 | 35 | 50 | 265   | 8  | 94    | 36 | -72 | +      | -      | -0.8                            | +13.8      | - |
| 17        |    | 10.6 | 35 | 46 | 266   | 31 | 93    | 13 | -72 | +      | -      | -0.6                            | +13.8      | - |
| 18        |    | 10.6 | 35 | 43 | 267   | 54 | 91    | 50 | -71 | +      | -      | -0.3                            | +13.9      | - |
| 19        |    | 10.5 | 35 | 42 | 269   | 17 | 90    | 26 | -71 | +      | -      | -0.1                            | +13.9      | - |
| +20       | 18 | 10.5 | 35 | 42 | 270   | 41 | 89    | 2  | -70 | +      | -      | +0.1                            | +13.9      | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| +0        | +0.05      | 0.0        | -0.4         | -0.3         |
| 5         | 0.05       | 0.0        | 0.4          | 0.3          |
| 10        | 0.05       | 0.0        | 0.4          | 0.3          |
| 15        | 0.05       | 0.0        | 0.4          | 0.3          |
| +20       | +0.04      | 0.0        | -0.4         | -0.3         |



TABLE II.

| Pair No. | E | No. | Star               | Mag. | $\alpha_{1950}$ |              | $\delta_{1950}$ |              |
|----------|---|-----|--------------------|------|-----------------|--------------|-----------------|--------------|
|          |   |     |                    |      | <sup>h</sup>    | <sup>m</sup> | <sup>°</sup>    | <sup>'</sup> |
| 151      | E | 173 | $\alpha$ Delphini  | 3.9  | 20              | 37.3         | +15             | 44           |
|          | W | 131 | $\gamma$ Serpentis | 3.9  | 15              | 54.1         | +15             | 49           |

| $\varphi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|---------------------------------|------------|---|
|           | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                      | $\Delta A$ | E |
| +0        | 18           | 15.7         | 38           | 54           | 244          | 25           | 115          | 44           | -67 | -42    | +      | -4.4                            | +11.1      | - |
| 1         |              | 15.7         | 38           | 28           | 245          | 33           | 114          | 35           | -68 | -39    | +      | -4.2                            | +11.4      | - |
| 2         |              | 15.7         | 38           | 4            | 246          | 42           | 113          | 27           | -69 | -37    | +      | -4.0                            | +11.7      | - |
| 3         |              | 15.7         | 37           | 41           | 247          | 53           | 112          | 16           | -69 | -34    | +      | -3.8                            | +12.0      | - |
| 4         |              | 15.7         | 37           | 19           | 249          | 6            | 111          | 3            | -70 | -31    | +      | -3.6                            | +12.3      | - |
| 5         |              | 15.7         | 35           | 58           | 250          | 21           | 109          | 49           | -70 | -28    | +      | -3.4                            | +12.5      | - |
| 6         |              | 15.7         | 35           | 38           | 251          | 37           | 108          | 33           | -71 | -25    | +      | -3.2                            | +12.8      | - |
| 7         |              | 15.7         | 35           | 20           | 252          | 54           | 107          | 16           | -71 | -22    | +      | -3.0                            | +13.0      | - |
| 8         |              | 15.7         | 35           | 3            | 254          | 12           | 105          | 57           | -71 | -18    | +      | -2.7                            | +13.2      | - |
| 9         |              | 15.7         | 35           | 47           | 255          | 32           | 104          | 37           | -72 | -15    | +      | -2.5                            | +13.4      | - |
| 10        |              | 15.7         | 35           | 32           | 256          | 53           | 103          | 16           | -72 | -11    | +      | -2.3                            | +13.6      | - |
| 11        |              | 15.7         | 35           | 19           | 258          | 16           | 101          | 54           | -72 | -8     | +      | -2.1                            | +13.8      | - |
| 12        |              | 15.7         | 35           | 8            | 259          | 39           | 100          | 30           | -72 | -4     | +      | -1.8                            | +14.0      | - |
| 13        |              | 15.7         | 34           | 58           | 261          | 4            | 99           | 6            | -72 | 0      |        | -1.6                            | +14.1      | - |
| 14        |              | 15.7         | 34           | 49           | 262          | 29           | 97           | 41           | -72 | +4     | -      | -1.3                            | +14.2      | - |
| 15        |              | 15.7         | 34           | 42           | 263          | 54           | 96           | 15           | -72 | +8     | -      | -1.1                            | +14.4      | - |
| 16        |              | 15.8         | 34           | 35           | 265          | 21           | 94           | 49           | -72 | +12    | -      | -0.8                            | +14.4      | - |
| 17        |              | 15.8         | 34           | 32           | 266          | 48           | 93           | 22           | -72 | +16    | -      | -0.6                            | +14.5      | - |
| 18        |              | 15.8         | 34           | 29           | 268          | 15           | 91           | 55           | -71 | +20    | -      | -0.3                            | +14.5      | - |
| 19        |              | 15.8         | 34           | 28           | 269          | 42           | 90           | 28           | -71 | +24    | -      | -0.1                            | +14.6      | - |
| +20       | 18           | 15.8         | 34           | 28           | 271          | 10           | 89           | 0            | -70 | +28    | -      | +0.1                            | +14.6      | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| +0        | m          | '          | '            | '            |
| 5         | +0.05      | 0.0        | -0.4         | -0.3         |
| 10        | 0.05       | 0.0        | 0.4          | 0.3          |
| 15        | 0.05       | 0.0        | 0.4          | 0.3          |
| +20       | +0.04      | 0.0        | -0.4         | -0.3         |

DATA REQUIRED FOR OBSERVATION.

| Pair No. | E | No. | Star                 | Mag. | $\alpha_{1950}$ |              | $\delta_{1950}$ |              |
|----------|---|-----|----------------------|------|-----------------|--------------|-----------------|--------------|
|          |   |     |                      |      | <sup>h</sup>    | <sup>m</sup> | <sup>°</sup>    | <sup>'</sup> |
| 152      | E | 175 | $\alpha$ Equulei     | 4.1  | 21              | 13.3         | +5              | 2            |
|          | W | 130 | $\epsilon$ Serpentis | 3.8  | 15              | 48.3         | +4              | 38           |

| $\varphi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |   |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|---------------------------------|------------|---|
|           | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                      | $\Delta A$ | E |
| +0        | 18           | 30.9         | 41           | 29           | 262          | 23           | 96           | 59           | -74 | -11    | +      | -1.3                            | +11.2      | - |
| 1         |              | 30.9         | 41           | 22           | 263          | 30           | 95           | 52           | -75 | -8     | +      | -1.1                            | +11.3      | - |
| 2         |              | 30.9         | 41           | 16           | 264          | 38           | 94           | 44           | -75 | -5     | +      | -0.9                            | +11.3      | - |
| 3         |              | 30.8         | 41           | 11           | 265          | 46           | 93           | 36           | -75 | -2     | +      | -0.7                            | +11.4      | - |
| 4         |              | 30.8         | 41           | 8            | 266          | 55           | 92           | 27           | -75 | +1     | -      | -0.5                            | +11.4      | - |
| 5         |              | 30.8         | 41           | 6            | 268          | 3            | 91           | 19           | -75 | +4     | -      | -0.3                            | +11.5      | - |
| 6         |              | 30.8         | 41           | 5            | 269          | 12           | 90           | 10           | -75 | +7     | -      | -0.1                            | +11.5      | - |
| 7         |              | 30.8         | 41           | 5            | 270          | 21           | 89           | 1            | -75 | +10    | -      | +0.1                            | +11.5      | - |
| 8         |              | 30.7         | 41           | 6            | 271          | 30           | 87           | 52           | -74 | +13    | -      | +0.3                            | +11.4      | - |
| 9         |              | 30.7         | 41           | 8            | 272          | 38           | 86           | 43           | -74 | +16    | -      | +0.5                            | +11.4      | - |
| 10        |              | 30.7         | 41           | 12           | 273          | 47           | 85           | 35           | -74 | +19    | -      | +0.7                            | +11.4      | - |
| 11        |              | 30.7         | 41           | 17           | 274          | 55           | 84           | 26           | -73 | +22    | -      | +0.9                            | +11.3      | - |
| 12        |              | 30.6         | 41           | 23           | 276          | 3            | 83           | 19           | -73 | +25    | -      | +1.1                            | +11.3      | - |
| 13        |              | 30.6         | 41           | 30           | 277          | 10           | 82           | 11           | -72 | +28    | -      | +1.3                            | +11.2      | - |
| 14        |              | 30.6         | 41           | 39           | 278          | 17           | 81           | 4            | -72 | +31    | -      | +1.5                            | +11.1      | - |
| 15        |              | 30.6         | 41           | 48           | 279          | 23           | 79           | 58           | -71 | +34    | -      | +1.7                            | +11.0      | - |
| 16        |              | 30.5         | 41           | 59           | 280          | 29           | 78           | 52           | -71 | +37    | -      | +1.9                            | +10.9      | - |
| 17        |              | 30.5         | 42           | 11           | 281          | 34           | 77           | 46           | -70 | +39    | -      | +2.1                            | +10.8      | - |
| 18        |              | 30.5         | 42           | 23           | 282          | 38           | 76           | 42           | -69 | +42    | -      | +2.3                            | +10.7      | - |
| 19        |              | 30.5         | 42           | 38           | 283          | 42           | 75           | 38           | -69 | +44    | -      | +2.4                            | +10.5      | - |
| +20       | 18           | 30.4         | 42           | 53           | 284          | 45           | 74           | 35           | -68 | +46    | -      | +2.6                            | +10.4      | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| +0        | m          | '          | '            | '            |
| 5         | +0.05      | 0.0        | -0.4         | -0.3         |
| 10        | 0.05       | 0.0        | 0.4          | 0.3          |
| 15        | 0.05       | 0.0        | 0.4          | 0.3          |
| +20       | +0.04      | 0.0        | -0.4         | -0.3         |



TABLE II.

|              | No.   | Star          | Mag. | $\alpha_{1950}$ | $\delta_{1950}$ |
|--------------|-------|---------------|------|-----------------|-----------------|
| Pair No. 153 | E 187 | $\eta$ Pegasi | 3.1  | 22 40.7         | +29 58          |
|              | W 117 | $\rho$ Bootis | 3.8  | 14 29.7         | +30 35          |

| $\phi$ | S  |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | dA <sub>E</sub> | dA <sub>W</sub> | Var. for $\Delta\phi = +10'$ |      |   |
|--------|----|------|----|----|-------|----|-------|----|-----|-----------------|-----------------|------------------------------|------|---|
|        | h  | m    | °  | '  | °     | '  | °     | '  |     |                 |                 | $\Delta z$                   | E    | W |
| +0     | 18 | 34.8 | 66 | 5  | 235   | 54 | 123   | 50 | -62 | -19             | +               | -5.5                         | +3.7 | - |
| 1      |    | 34.8 | 65 | 32 | 237   | 16 | 123   | 27 | -63 | -18             | +               | -5.5                         | +3.8 | - |
| 2      |    | 34.8 | 64 | 59 | 237   | 39 | 123   | 4  | -63 | -17             | +               | -5.4                         | +3.9 | - |
| 3      |    | 34.8 | 64 | 27 | 238   | 3  | 122   | 40 | -63 | -16             | +               | -5.3                         | +4.1 | - |
| 4      |    | 34.9 | 63 | 55 | 238   | 28 | 122   | 16 | -64 | -15             | +               | -5.3                         | +4.2 | - |
| 5      |    | 34.9 | 63 | 24 | 238   | 53 | 121   | 50 | -64 | -14             | +               | -5.2                         | +4.3 | - |
| 6      |    | 34.9 | 62 | 52 | 239   | 19 | 121   | 24 | -64 | -13             | +               | -5.2                         | +4.4 | - |
| 7      |    | 34.9 | 62 | 22 | 239   | 46 | 120   | 58 | -64 | -11             | +               | -5.1                         | +4.5 | - |
| 8      |    | 35.0 | 61 | 51 | 240   | 13 | 120   | 30 | -64 | -10             | +               | -5.0                         | +4.6 | - |
| 9      |    | 35.0 | 61 | 21 | 240   | 41 | 120   | 2  | -64 | -9              | +               | -5.0                         | +4.8 | - |
| 10     |    | 35.0 | 60 | 52 | 241   | 10 | 119   | 34 | -64 | -8              | +               | -4.9                         | +4.9 | - |
| 11     |    | 35.0 | 60 | 23 | 241   | 40 | 119   | 4  | -65 | -6              | +               | -4.8                         | +5.0 | - |
| 12     |    | 35.1 | 59 | 54 | 242   | 10 | 118   | 34 | -65 | -5              | +               | -4.7                         | +5.1 | - |
| 13     |    | 35.1 | 59 | 26 | 242   | 41 | 118   | 3  | -65 | -4              | +               | -4.6                         | +5.2 | - |
| 14     |    | 35.1 | 58 | 59 | 243   | 13 | 117   | 31 | -65 | -2              | +               | -4.6                         | +5.4 | - |
| 15     |    | 35.2 | 58 | 32 | 243   | 46 | 116   | 59 | -65 | -1              | +               | -4.5                         | +5.5 | - |
| 16     |    | 35.2 | 58 | 5  | 244   | 19 | 116   | 26 | -65 | +1              | -               | -4.4                         | +5.6 | - |
| 17     |    | 35.2 | 57 | 39 | 244   | 53 | 115   | 52 | -65 | +2              | -               | -4.3                         | +5.7 | - |
| 18     |    | 35.2 | 57 | 13 | 245   | 28 | 115   | 18 | -65 | +4              | -               | -4.2                         | +5.9 | - |
| 19     |    | 35.3 | 56 | 48 | 246   | 4  | 114   | 42 | -65 | +5              | -               | -4.1                         | +6.0 | - |
| +20    | 18 | 35.3 | 56 | 24 | 246   | 40 | 114   | 6  | -64 | +6              | -               | -4.0                         | +6.1 | - |

Annual Precessions of S, z, A<sub>E</sub>, and A<sub>W</sub>.

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| 0      | m          | '          | '            | '            |
| +0     | +0.05      | 0.0        | -0.4         | -0.3         |
| 5      | 0.05       | 0.0        | 0.4          | 0.3          |
| 10     | 0.05       | 0.0        | 0.4          | 0.3          |
| 15     | 0.05       | 0.0        | 0.4          | 0.3          |
| +20    | +0.04      | 0.0        | -0.4         | -0.3         |

DATA REQUIRED FOR OBSERVATION.

|              | No.   | Star               | Mag. | $\alpha_{1950}$ | $\delta_{1950}$ |
|--------------|-------|--------------------|------|-----------------|-----------------|
| Pair No. 154 | E 174 | $\epsilon$ Aquarii | 3.8  | 20 45.0         | -9 41           |
|              | W 137 | $\zeta$ Ophiuchi   | 2.7  | 16 34.4         | -10 28          |

| $\phi$ | S  |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | dA <sub>E</sub> | dA <sub>W</sub> | Var. for $\Delta\phi = +10'$ |       |   |
|--------|----|------|----|----|-------|----|-------|----|-----|-----------------|-----------------|------------------------------|-------|---|
|        | h  | m    | °  | '  | °     | '  | °     | '  |     |                 |                 | $\Delta z$                   | E     | W |
| +0     | 18 | 39.2 | 33 | 20 | 287   | 48 | 70    | 41 | -71 | +38             | -               | +3.2                         | +14.5 | - |
| 1      |    | 39.2 | 33 | 40 | 289   | 14 | 69    | 16 | -70 | +41             | -               | +3.4                         | +14.1 | - |
| 2      |    | 39.1 | 34 | 1  | 290   | 37 | 67    | 52 | -70 | +45             | -               | +3.7                         | +13.8 | - |
| 3      |    | 39.1 | 34 | 24 | 291   | 59 | 66    | 30 | -69 | +48             | -               | +3.9                         | +13.4 | - |
| 4      |    | 39.0 | 34 | 48 | 293   | 19 | 65    | 10 | -68 | +51             | -               | +4.1                         | +13.1 | - |
| 5      |    | 39.0 | 35 | 13 | 294   | 36 | 63    | 53 | -67 | +54             | -               | +4.3                         | +12.8 | - |
| 6      |    | 38.9 | 35 | 39 | 295   | 52 | 62    | 37 | -67 | +56             | -               | +4.5                         | +12.4 | - |
| 7      |    | 38.9 | 36 | 6  | 297   | 6  | 61    | 23 | -66 | +59             | -               | +4.7                         | +12.1 | - |
| 8      |    | 38.8 | 36 | 35 | 298   | 17 | 60    | 11 | -65 | +61             | -               | +4.8                         | +11.8 | - |
| 9      |    | 38.8 | 37 | 5  | 299   | 27 | 59    | 1  | -64 | +63             | -               | +5.0                         | +11.4 | - |
| 10     |    | 38.7 | 37 | 35 | 300   | 34 | 57    | 54 | -63 | +65             | -               | +5.2                         | +11.1 | - |
| 11     |    | 38.6 | 38 | 7  | 301   | 40 | 56    | 48 | -62 | +66             | -               | +5.4                         | +10.7 | - |
| 12     |    | 38.6 | 38 | 40 | 302   | 43 | 55    | 41 | -61 | +68             | -               | +5.5                         | +10.4 | - |
| 13     |    | 38.5 | 39 | 13 | 303   | 44 | 54    | 42 | -60 | +69             | -               | +5.7                         | +10.1 | - |
| 14     |    | 38.5 | 39 | 48 | 304   | 44 | 53    | 43 | -59 | +71             | -               | +5.8                         | +9.7  | - |
| 15     |    | 38.4 | 40 | 23 | 305   | 41 | 52    | 45 | -58 | +72             | -               | +6.0                         | +9.4  | - |
| 16     |    | 38.4 | 40 | 59 | 306   | 37 | 51    | 49 | -57 | +73             | -               | +6.1                         | +9.1  | - |
| 17     |    | 38.3 | 41 | 36 | 307   | 31 | 50    | 54 | -56 | +74             | -               | +6.2                         | +8.8  | - |
| 18     |    | 38.3 | 42 | 13 | 308   | 23 | 50    | 2  | -55 | +74             | -               | +6.3                         | +8.5  | - |
| 19     |    | 38.2 | 42 | 52 | 309   | 13 | 49    | 11 | -54 | +75             | -               | +6.4                         | +8.2  | - |
| +20    | 18 | 38.1 | 43 | 31 | 310   | 1  | 48    | 22 | -53 | +75             | -               | +6.5                         | +7.9  | - |

Annual Precessions of S, z, A<sub>E</sub>, and A<sub>W</sub>.

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| 0      | m          | '          | '            | '            |
| +0     | +0.05      | 0.0        | -0.4         | -0.3         |
| 5      | 0.05       | 0.0        | 0.4          | 0.3          |
| 10     | 0.05       | 0.0        | 0.4          | 0.3          |
| 15     | 0.05       | 0.0        | 0.4          | 0.3          |
| +20    | +0.04      | 0.0        | -0.4         | -0.3         |



TABLE II.

| Pair No. | E | No. | Star             | Mag. | $\alpha_{1950}$ |              | $\delta_{1950}$ |              |
|----------|---|-----|------------------|------|-----------------|--------------|-----------------|--------------|
|          |   |     |                  |      | <sup>h</sup>    | <sup>m</sup> | <sup>°</sup>    | <sup>'</sup> |
| 155      | E | 189 | $\delta$ Aquarii | 3.5  | 22              | 52.0         | -16             | 5            |
|          | W | 120 | $\alpha^2$ Libræ | 2.9  | 14              | 48.1         | -15             | 50           |

| $\phi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |            |   |
|--------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|------------------------------|------------|---|
|        | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                   | $\Delta A$ | E |
| +0     | 18           | 50.1         | 62           | 19           | 288          | 14           | 72           | 3            | -71 | +13    | -      | +3.1                         | +5.0       | - |
| 1      |              | 50.1         | 62           | 38           | 288          | 44           | 71           | 34           | -71 | +14    | -      | +3.2                         | +4.9       | - |
| 2      |              | 50.2         | 62           | 58           | 289          | 13           | 71           | 5            | -71 | +16    | -      | +3.3                         | +4.8       | - |
| 3      |              | 50.2         | 63           | 18           | 289          | 42           | 70           | 36           | -71 | +17    | -      | +3.3                         | +4.7       | - |
| 4      |              | 50.2         | 63           | 38           | 290          | 10           | 70           | 8            | -70 | +18    | -      | +3.4                         | +4.7       | - |
| 5      |              | 50.2         | 63           | 59           | 290          | 37           | 69           | 40           | -70 | +20    | -      | +3.5                         | +4.6       | - |
| 6      |              | 50.2         | 64           | 20           | 291          | 5            | 69           | 13           | -70 | +21    | -      | +3.6                         | +4.5       | - |
| 7      |              | 50.2         | 64           | 41           | 291          | 31           | 68           | 46           | -69 | +22    | -      | +3.6                         | +4.4       | - |
| 8      |              | 50.2         | 65           | 4            | 291          | 58           | 68           | 20           | -69 | +24    | -      | +3.7                         | +4.3       | - |
| 9      |              | 50.2         | 65           | 26           | 292          | 23           | 67           | 54           | -68 | +25    | -      | +3.8                         | +4.2       | - |
| 10     |              | 50.2         | 65           | 49           | 292          | 48           | 67           | 29           | -68 | +26    | -      | +3.9                         | +4.2       | - |
| 11     |              | 50.2         | 66           | 12           | 293          | 13           | 67           | 5            | -68 | +27    | -      | +3.9                         | +4.1       | - |
| 12     |              | 50.3         | 66           | 36           | 293          | 37           | 66           | 41           | -67 | +29    | -      | +4.0                         | +4.0       | - |
| 13     |              | 50.3         | 67           | 0            | 294          | 1            | 66           | 17           | -67 | +30    | -      | +4.1                         | +3.9       | - |
| 14     |              | 50.3         | 67           | 24           | 294          | 24           | 65           | 54           | -66 | +31    | -      | +4.1                         | +3.8       | - |
| 15     |              | 50.3         | 67           | 49           | 294          | 46           | 65           | 32           | -66 | +32    | -      | +4.2                         | +3.7       | - |
| 16     |              | 50.3         | 68           | 14           | 295          | 8            | 65           | 10           | -65 | +33    | -      | +4.2                         | +3.6       | - |
| 17     |              | 50.3         | 68           | 40           | 295          | 30           | 64           | 48           | -65 | +34    | -      | +4.3                         | +3.5       | - |
| 18     |              | 50.3         | 69           | 6            | 295          | 51           | 64           | 28           | -64 | +35    | -      | +4.3                         | +3.5       | - |
| 19     |              | 50.3         | 69           | 32           | 296          | 11           | 64           | 7            | -64 | +36    | -      | +4.4                         | +3.4       | - |
| +20    | 18           | 50.3         | 69           | 59           | 295          | 31           | 63           | 47           | -63 | +37    | -      | +4.4                         | +3.3       | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| +0     | +0.05      | 0.0        | -0.4         | -0.3         |
| 5      | 0.05       | 0.0        | 0.4          | 0.3          |
| 10     | 0.05       | 0.0        | 0.4          | 0.3          |
| 15     | 0.05       | 0.0        | 0.4          | 0.3          |
| +20    | +0.04      | 0.0        | -0.4         | -0.3         |

| Pair No. | E | No. | Star               | Mag. | $\alpha_{1950}$ |              | $\delta_{1950}$ |              |
|----------|---|-----|--------------------|------|-----------------|--------------|-----------------|--------------|
|          |   |     |                    |      | <sup>h</sup>    | <sup>m</sup> | <sup>°</sup>    | <sup>'</sup> |
| 156      | E | 183 | $\theta$ Pegasi    | 3.7  | 22              | 7.7          | +5              | 57           |
|          | W | 126 | $\alpha$ Serpentis | 2.8  | 15              | 41.8         | +6              | 35           |

| $\phi$ | S            |              | z            |              | $A_E$        |              | $A_W$        |              | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |            |   |
|--------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|--------|--------|------------------------------|------------|---|
|        | <sup>h</sup> | <sup>m</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> | <sup>°</sup> | <sup>'</sup> |     |        |        | $\Delta z$                   | $\Delta A$ | E |
| +0     | 18           | 54.6         | 49           | 9            | 262          | 8            | 98           | 43           | -74 | -10    | +      | -1.4                         | +8.6       | - |
| 1      |              | 54.7         | 49           | 1            | 262          | 59           | 97           | 52           | -74 | -7     | +      | -1.3                         | +8.6       | - |
| 2      |              | 54.7         | 48           | 54           | 263          | 51           | 97           | 0            | -75 | -5     | +      | -1.1                         | +8.7       | - |
| 3      |              | 54.7         | 48           | 48           | 264          | 43           | 96           | 8            | -75 | -3     | +      | -1.0                         | +8.7       | - |
| 4      |              | 54.7         | 48           | 42           | 265          | 36           | 95           | 15           | -75 | 0      |        | -0.8                         | +8.8       | - |
| 5      |              | 54.8         | 48           | 37           | 266          | 28           | 94           | 23           | -75 | +2     | -      | -0.7                         | +8.8       | - |
| 6      |              | 54.8         | 48           | 34           | 267          | 21           | 93           | 30           | -75 | +4     | -      | -0.5                         | +8.8       | - |
| 7      |              | 54.8         | 48           | 31           | 268          | 14           | 92           | 37           | -74 | +7     | -      | -0.4                         | +8.8       | - |
| 8      |              | 54.9         | 48           | 29           | 269          | 7            | 91           | 44           | -74 | +9     | -      | -0.2                         | +8.9       | - |
| 9      |              | 54.9         | 48           | 28           | 270          | 1            | 90           | 51           | -74 | +11    | -      | -0.1                         | +8.9       | - |
| 10     |              | 54.9         | 48           | 28           | 270          | 54           | 89           | 58           | -74 | +14    | -      | +0.1                         | +8.9       | - |
| 11     |              | 55.0         | 48           | 29           | 271          | 47           | 89           | 5            | -74 | +16    | -      | +0.2                         | +8.9       | - |
| 12     |              | 55.0         | 48           | 31           | 272          | 40           | 88           | 12           | -73 | +18    | -      | +0.4                         | +8.8       | - |
| 13     |              | 55.0         | 48           | 34           | 273          | 33           | 87           | 19           | -73 | +21    | -      | +0.5                         | +8.8       | - |
| 14     |              | 55.0         | 48           | 38           | 274          | 26           | 86           | 27           | -73 | +23    | -      | +0.7                         | +8.8       | - |
| 15     |              | 55.1         | 48           | 42           | 275          | 19           | 85           | 34           | -72 | +25    | -      | +0.9                         | +8.8       | - |
| 16     |              | 55.1         | 48           | 48           | 276          | 11           | 84           | 42           | -72 | +27    | -      | +1.0                         | +8.7       | - |
| 17     |              | 55.1         | 48           | 54           | 277          | 3            | 83           | 50           | -71 | +30    | -      | +1.2                         | +8.7       | - |
| 18     |              | 55.2         | 49           | 2            | 277          | 55           | 82           | 58           | -71 | +32    | -      | +1.3                         | +8.6       | - |
| 19     |              | 55.2         | 49           | 10           | 278          | 47           | 82           | 7            | -70 | +34    | -      | +1.5                         | +8.6       | - |
| +20    | 18           | 55.2         | 49           | 19           | 279          | 38           | 81           | 16           | -69 | +36    | -      | +1.6                         | +8.5       | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|--------|------------|------------|--------------|--------------|
| +0     | +0.05      | 0.0        | -0.4         | -0.3         |
| 5      | 0.05       | 0.0        | 0.4          | 0.3          |
| 10     | 0.05       | 0.0        | 0.4          | 0.3          |
| 15     | 0.05       | 0.0        | 0.4          | 0.3          |
| +20    | +0.04      | 0.0        | -0.4         | -0.3         |



TABLE II.

| Pair No. | No.   | Star                | Mag. | $\alpha$   |      | $\delta_{1950}$ |
|----------|-------|---------------------|------|------------|------|-----------------|
|          |       |                     |      | $^{\circ}$ | $'$  |                 |
| 157      | E 187 | $\eta$ Pegasi       | 3.1  | 22         | 40.7 | +29 58          |
|          | W 124 | $\beta$ Coron. Bor. | 3.7  | 15         | 25.8 | +29 17          |

| $\varphi$ | S          |     | z          |     | $A_E$      |     | $A_W$      |     | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |       |   |
|-----------|------------|-----|------------|-----|------------|-----|------------|-----|-----|--------|--------|---------------------------------|------------|-------|---|
|           | $^{\circ}$ | $'$ | $^{\circ}$ | $'$ | $^{\circ}$ | $'$ | $^{\circ}$ | $'$ |     |        |        | $\Delta z$                      | $\Delta A$ | E     | W |
| + 0       | 19         | 3.8 | 60         | 5   | 234        | 49  | 124        | 21  | -61 | -      | 25     | +                               | -5.7       | + 4.7 | - |
| 1         |            | 3.7 | 59         | 31  | 235        | 18  | 123        | 52  | -62 | -      | 24     | +                               | -5.6       | + 4.9 | - |
| 2         |            | 3.7 | 58         | 57  | 235        | 47  | 123        | 22  | -62 | -      | 23     | +                               | -5.6       | + 5.0 | - |
| 3         |            | 3.7 | 58         | 24  | 236        | 18  | 122        | 52  | -63 | -      | 22     | +                               | -5.5       | + 5.1 | - |
| 4         |            | 3.6 | 57         | 51  | 236        | 49  | 122        | 20  | -63 | -      | 21     | +                               | -5.4       | + 5.3 | - |
| 5         |            | 3.6 | 57         | 19  | 237        | 21  | 121        | 48  | -63 | -      | 20     | +                               | -5.3       | + 5.4 | - |
| 6         |            | 3.6 | 56         | 47  | 237        | 54  | 121        | 15  | -63 | -      | 18     | +                               | -5.3       | + 5.6 | - |
| 7         |            | 3.6 | 56         | 16  | 238        | 28  | 120        | 41  | -64 | -      | 17     | +                               | -5.2       | + 5.7 | - |
| 8         |            | 3.5 | 55         | 45  | 239        | 3   | 120        | 6   | -64 | -      | 16     | +                               | -5.1       | + 5.9 | - |
| 9         |            | 3.5 | 55         | 15  | 239        | 38  | 119        | 31  | -64 | -      | 15     | +                               | -5.0       | + 6.0 | - |
| 10        |            | 3.5 | 54         | 45  | 240        | 15  | 118        | 54  | -64 | -      | 13     | +                               | -4.9       | + 6.1 | - |
| 11        |            | 3.4 | 54         | 16  | 240        | 52  | 118        | 17  | -64 | -      | 12     | +                               | -4.8       | + 6.3 | - |
| 12        |            | 3.4 | 53         | 48  | 241        | 30  | 117        | 38  | -65 | -      | 10     | +                               | -4.7       | + 6.5 | - |
| 13        |            | 3.4 | 53         | 20  | 242        | 9   | 116        | 59  | -65 | -      | 9      | +                               | -4.6       | + 6.6 | - |
| 14        |            | 3.3 | 52         | 53  | 242        | 49  | 116        | 19  | -65 | -      | 7      | +                               | -4.5       | + 6.7 | - |
| 15        |            | 3.3 | 52         | 26  | 243        | 30  | 115        | 38  | -65 | -      | 6      | +                               | -4.4       | + 6.9 | - |
| 16        |            | 3.3 | 52         | 0   | 244        | 12  | 114        | 56  | -65 | -      | 4      | +                               | -4.3       | + 7.0 | - |
| 17        |            | 3.3 | 52         | 34  | 244        | 55  | 114        | 13  | -65 | -      | 2      | +                               | -4.2       | + 7.2 | - |
| 18        |            | 3.2 | 51         | 10  | 245        | 38  | 113        | 29  | -65 | -      | 1      | +                               | -4.1       | + 7.3 | - |
| 19        |            | 3.2 | 50         | 46  | 246        | 23  | 112        | 44  | -65 | +      | 1      | -                               | -3.9       | + 7.5 | - |
| +20       | 19         | 3.2 | 50         | 23  | 247        | 8   | 111        | 59  | -65 | +      | 3      | -                               | -3.8       | + 7.7 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$  | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|------------|------------|------------|--------------|--------------|
| $^{\circ}$ | m          | $'$        | $'$          | $'$          |
| + 0        | +0.05      | +0.1       | -0.4         | -0.3         |
| 5          | 0.05       | +0.1       | 0.4          | 0.3          |
| 10         | 0.05       | 0.0        | 0.4          | 0.3          |
| 15         | 0.05       | 0.0        | 0.4          | 0.3          |
| +20        | +0.04      | 0.0        | -0.4         | -0.3         |

DATA REQUIRED FOR OBSERVATION.

| Pair No. | No.   | Star                 | Mag. | $\alpha_{1950}$ |      | $\delta_{1950}$ |
|----------|-------|----------------------|------|-----------------|------|-----------------|
|          |       |                      |      | $^{\circ}$      | $'$  |                 |
| 158      | E 190 | $\beta$ Pegasi       | 2.6  | 23              | 1.3  | +27 49          |
|          | W 125 | $\alpha$ Coron. Bor. | 2.3  | 15              | 32.6 | +26 53          |

| $\varphi$ | S          |      | z          |     | $A_E$      |     | $A_W$      |     | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\varphi = +10'$ |            |       |   |
|-----------|------------|------|------------|-----|------------|-----|------------|-----|-----|--------|--------|---------------------------------|------------|-------|---|
|           | $^{\circ}$ | $'$  | $^{\circ}$ | $'$ | $^{\circ}$ | $'$ | $^{\circ}$ | $'$ |     |        |        | $\Delta z$                      | $\Delta A$ | E     | W |
| + 0       | 19         | 17.6 | 60         | 50  | 237        | 42  | 121        | 11  | -64 | -      | 23     | +                               | -5.2       | + 4.8 | - |
| 1         |            | 17.6 | 60         | 19  | 238        | 11  | 120        | 42  | -64 | -      | 22     | +                               | -5.2       | + 4.9 | - |
| 2         |            | 17.5 | 59         | 48  | 238        | 41  | 120        | 12  | -64 | -      | 20     | +                               | -5.1       | + 5.0 | - |
| 3         |            | 17.5 | 59         | 17  | 239        | 11  | 119        | 42  | -65 | -      | 19     | +                               | -5.0       | + 5.1 | - |
| 4         |            | 17.5 | 58         | 47  | 239        | 42  | 119        | 11  | -65 | -      | 18     | +                               | -5.0       | + 5.3 | - |
| 5         |            | 17.4 | 58         | 18  | 240        | 14  | 118        | 39  | -65 | -      | 17     | +                               | -4.9       | + 5.4 | - |
| 6         |            | 17.4 | 57         | 49  | 240        | 47  | 118        | 6   | -65 | -      | 15     | +                               | -4.8       | + 5.5 | - |
| 7         |            | 17.3 | 57         | 20  | 241        | 20  | 117        | 32  | -66 | -      | 14     | +                               | -4.7       | + 5.6 | - |
| 8         |            | 17.3 | 56         | 52  | 241        | 54  | 116        | 58  | -66 | -      | 13     | +                               | -4.6       | + 5.8 | - |
| 9         |            | 17.3 | 56         | 25  | 242        | 29  | 116        | 23  | -66 | -      | 11     | +                               | -4.5       | + 5.9 | - |
| 10        |            | 17.2 | 55         | 58  | 243        | 5   | 115        | 47  | -66 | -      | 10     | +                               | -4.4       | + 6.0 | - |
| 11        |            | 17.2 | 55         | 31  | 243        | 42  | 115        | 10  | -66 | -      | 8      | +                               | -4.3       | + 6.2 | - |
| 12        |            | 17.1 | 55         | 6   | 244        | 19  | 114        | 32  | -66 | -      | 7      | +                               | -4.2       | + 6.3 | - |
| 13        |            | 17.1 | 54         | 40  | 244        | 57  | 113        | 54  | -66 | -      | 5      | +                               | -4.1       | + 6.4 | - |
| 14        |            | 17.1 | 54         | 16  | 245        | 36  | 113        | 14  | -67 | -      | 3      | +                               | -4.0       | + 6.6 | - |
| 15        |            | 17.0 | 53         | 52  | 246        | 16  | 112        | 34  | -67 | -      | 2      | +                               | -3.9       | + 6.7 | - |
| 16        |            | 17.0 | 53         | 29  | 246        | 57  | 111        | 54  | -67 | -      | 0      | -                               | -3.8       | + 6.8 | - |
| 17        |            | 16.9 | 53         | 6   | 247        | 38  | 111        | 12  | -67 | +      | 2      | -                               | -3.7       | + 6.9 | - |
| 18        |            | 16.9 | 52         | 44  | 248        | 20  | 110        | 30  | -67 | +      | 3      | -                               | -3.6       | + 7.1 | - |
| 19        |            | 16.8 | 52         | 23  | 249        | 3   | 109        | 46  | -67 | +      | 5      | -                               | -3.5       | + 7.2 | - |
| +20       | 19         | 16.8 | 52         | 3   | 249        | 46  | 109        | 2   | -66 | +      | 7      | -                               | -3.4       | + 7.3 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\varphi$  | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|------------|------------|------------|--------------|--------------|
| $^{\circ}$ | m          | $'$        | $'$          | $'$          |
| + 0        | +0.05      | +0.1       | -0.4         | -0.3         |
| 5          | 0.05       | +0.1       | 0.4          | 0.3          |
| 10         | 0.05       | 0.0        | 0.4          | 0.3          |
| 15         | 0.05       | 0.0        | 0.4          | 0.3          |
| +20        | +0.04      | 0.0        | -0.4         | -0.3         |



TABLE II.

|              | No.   | Star              | Mag. | $\alpha_{1950}$                 | $\delta_{1950}$      |
|--------------|-------|-------------------|------|---------------------------------|----------------------|
| Pair No. 159 | E 191 | $\alpha$ Pegasi   | 2.6  | 23 <sup>h</sup> 23 <sup>m</sup> | +14 <sup>o</sup> 56' |
|              | W 127 | $\beta$ Serpentis | 3.7  | 15 43.9                         | +15 35               |

| $\varphi$ | S  |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | dA <sub>E</sub> | dA <sub>W</sub> | Var. for $\Delta\varphi = +10'$ |   |     |   |
|-----------|----|------|----|----|-------|----|-------|----|-----|-----------------|-----------------|---------------------------------|---|-----|---|
|           | h  | m    | o  | '  | o     | '  | o     | '  |     |                 |                 | $\Delta z$                      | E | W   |   |
| +0        | 19 | 22.8 | 56 | 48 | 252   | 4  | 108   | 43 | -71 | -16             | +               | -3.2                            | + | 6.2 | - |
| 1         |    | 22.9 | 56 | 30 | 252   | 42 | 108   | 6  | -72 | -14             | +               | -3.0                            | + | 6.3 | - |
| 2         |    | 22.9 | 56 | 12 | 253   | 20 | 107   | 27 | -72 | -13             | +               | -2.9                            | + | 6.4 | - |
| 3         |    | 22.9 | 55 | 55 | 253   | 58 | 106   | 49 | -72 | -11             | +               | -2.8                            | + | 6.5 | - |
| 4         |    | 22.9 | 55 | 38 | 254   | 38 | 106   | 10 | -72 | -9              | +               | -2.7                            | + | 6.6 | - |
| 5         |    | 23.0 | 55 | 22 | 255   | 17 | 105   | 30 | -72 | -7              | +               | -2.6                            | + | 6.7 | - |
| 6         |    | 23.0 | 55 | 7  | 255   | 58 | 104   | 50 | -72 | -5              | +               | -2.5                            | + | 6.8 | - |
| 7         |    | 23.0 | 54 | 52 | 256   | 39 | 104   | 9  | -72 | -4              | +               | -2.4                            | + | 6.9 | - |
| 8         |    | 23.0 | 54 | 38 | 257   | 20 | 103   | 28 | -72 | -2              | +               | -2.3                            | + | 6.9 | - |
| 9         |    | 23.1 | 54 | 25 | 258   | 2  | 102   | 46 | -72 | 0               |                 | -2.1                            | + | 7.0 | - |
| 10        |    | 23.1 | 54 | 12 | 258   | 44 | 102   | 4  | -72 | +2              | -               | -2.0                            | + | 7.1 | - |
| 11        |    | 23.1 | 54 | 1  | 259   | 26 | 101   | 22 | -72 | +4              | -               | -1.9                            | + | 7.1 | - |
| 12        |    | 23.2 | 53 | 50 | 260   | 10 | 100   | 39 | -72 | +6              | -               | -1.8                            | + | 7.2 | - |
| 13        |    | 23.2 | 53 | 39 | 260   | 53 | 99    | 55 | -72 | +8              | -               | -1.7                            | + | 7.3 | - |
| 14        |    | 23.2 | 53 | 30 | 261   | 37 | 99    | 12 | -72 | +10             | -               | -1.5                            | + | 7.3 | - |
| 15        |    | 23.2 | 53 | 21 | 262   | 21 | 98    | 28 | -72 | +12             | -               | -1.4                            | + | 7.4 | - |
| 16        |    | 23.3 | 53 | 13 | 263   | 5  | 97    | 44 | -72 | +14             | -               | -1.3                            | + | 7.4 | - |
| 17        |    | 23.3 | 53 | 6  | 263   | 50 | 96    | 59 | -71 | +16             | -               | -1.1                            | + | 7.5 | - |
| 18        |    | 23.3 | 52 | 59 | 264   | 35 | 96    | 14 | -71 | +18             | -               | -1.0                            | + | 7.5 | - |
| 19        |    | 23.4 | 52 | 53 | 265   | 20 | 95    | 29 | -71 | +20             | -               | -0.9                            | + | 7.6 | - |
| +20       | 19 | 23.4 | 52 | 48 | 266   | 6  | 94    | 44 | -70 | +22             | -               | -0.7                            | + | 7.6 | - |

Annual Precessions of S, z, A<sub>E</sub>, and A<sub>W</sub>.

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| +0        | +0.05      | 0.0        | -0.4         | -0.2         |
| 5         | 0.05       | 0.0        | 0.4          | 0.2          |
| 10        | 0.05       | 0.0        | 0.4          | 0.2          |
| 15        | 0.05       | 0.0        | 0.4          | 0.2          |
| +20       | +0.04      | 0.0        | -0.4         | -0.2         |

DATA REQUIRED FOR OBSERVATION.

|              | No.   | Star                   | Mag. | $\alpha_{1950}$                 | $\delta_{1950}$      |
|--------------|-------|------------------------|------|---------------------------------|----------------------|
| Pair No. 160 | E 190 | $\beta$ Pegasi         | 2.6  | 23 <sup>h</sup> 13 <sup>m</sup> | +27 <sup>o</sup> 49' |
|              | W 132 | $\epsilon$ Coron. Bor. | 4.2  | 15 55.5                         | +27 1                |

| $\varphi$ | S  |      | z  |    | $A_E$ |    | $A_W$ |    | dz  | dA <sub>E</sub> | dA <sub>W</sub> | Var. for $\Delta\varphi = +10'$ |   |     |   |
|-----------|----|------|----|----|-------|----|-------|----|-----|-----------------|-----------------|---------------------------------|---|-----|---|
|           | h  | m    | o  | '  | o     | '  | o     | '  |     |                 |                 | $\Delta z$                      | E | W   |   |
| +0        | 19 | 29.0 | 58 | 26 | 236   | 48 | 122   | 13 | -63 | -26             | +               | -5.4                            | + | 5.2 | - |
| 1         |    | 29.0 | 57 | 53 | 237   | 19 | 121   | 42 | -63 | -24             | +               | -5.3                            | + | 5.3 | - |
| 2         |    | 29.0 | 57 | 22 | 237   | 51 | 121   | 9  | -64 | -23             | +               | -5.2                            | + | 5.5 | - |
| 3         |    | 28.9 | 56 | 51 | 238   | 25 | 120   | 36 | -64 | -22             | +               | -5.2                            | + | 5.6 | - |
| 4         |    | 28.9 | 56 | 20 | 238   | 59 | 120   | 2  | -65 | -21             | +               | -5.1                            | + | 5.7 | - |
| 5         |    | 28.9 | 55 | 50 | 239   | 33 | 119   | 27 | -65 | -19             | +               | -5.0                            | + | 5.9 | - |
| 6         |    | 28.8 | 55 | 20 | 240   | 9  | 118   | 52 | -65 | -18             | +               | -4.9                            | + | 6.0 | - |
| 7         |    | 28.8 | 54 | 51 | 240   | 46 | 118   | 15 | -65 | -17             | +               | -4.8                            | + | 6.2 | - |
| 8         |    | 28.8 | 54 | 22 | 241   | 23 | 117   | 37 | -66 | -15             | +               | -4.7                            | + | 6.3 | - |
| 9         |    | 28.7 | 53 | 54 | 242   | 1  | 116   | 59 | -66 | -14             | +               | -4.6                            | + | 6.5 | - |
| 10        |    | 28.7 | 53 | 27 | 242   | 40 | 116   | 20 | -66 | -12             | +               | -4.5                            | + | 6.6 | - |
| 11        |    | 28.7 | 53 | 0  | 243   | 21 | 115   | 39 | -66 | -11             | +               | -4.4                            | + | 6.8 | - |
| 12        |    | 28.6 | 52 | 34 | 244   | 1  | 114   | 58 | -66 | -9              | +               | -4.3                            | + | 6.9 | - |
| 13        |    | 28.6 | 52 | 8  | 244   | 43 | 114   | 16 | -66 | -7              | +               | -4.2                            | + | 7.0 | - |
| 14        |    | 28.6 | 51 | 44 | 245   | 26 | 113   | 33 | -66 | -6              | +               | -4.1                            | + | 7.2 | - |
| 15        |    | 28.5 | 51 | 19 | 246   | 9  | 112   | 49 | -66 | -4              | +               | -4.0                            | + | 7.3 | - |
| 16        |    | 28.5 | 50 | 56 | 246   | 54 | 112   | 5  | -67 | -2              | +               | -3.8                            | + | 7.5 | - |
| 17        |    | 28.4 | 50 | 33 | 247   | 39 | 111   | 19 | -67 | 0               |                 | -3.7                            | + | 7.6 | - |
| 18        |    | 28.4 | 50 | 11 | 248   | 25 | 110   | 33 | -67 | +1              | -               | -3.6                            | + | 7.7 | - |
| 19        |    | 28.4 | 49 | 50 | 249   | 12 | 109   | 46 | -67 | +3              | -               | -3.5                            | + | 7.9 | - |
| +20       | 19 | 28.3 | 49 | 30 | 250   | 0  | 108   | 57 | -66 | +5              | -               | -3.3                            | + | 8.0 | - |

Annual Precessions of S, z, A<sub>E</sub>, and A<sub>W</sub>.

| $\varphi$ | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|-----------|------------|------------|--------------|--------------|
| 0         | m          | '          | '            | '            |
| +0        | +0.05      | +0.1       | -0.4         | -0.2         |
| 5         | 0.05       | 0.1        | 0.4          | 0.2          |
| 10        | 0.05       | 0.1        | 0.4          | 0.2          |
| 15        | 0.05       | +0.1       | 0.4          | 0.2          |
| +20       | +0.04      | 0.0        | -0.4         | -0.2         |



TABLE II.

Pair No. 161  
 E 192 88 Aquarii 3.8  $\alpha_{1950}$   $\delta_{1950}$   
 $23^h 6^m 28^s$   $-21^{\circ} 27'$   
 W 133  $\delta$  Scorpii 2.5 15 57.4  $-22^{\circ} 29'$

| $\phi$ | S          |      | z          |     | $A_E$      |     | $A_W$      |     | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |      |   |
|--------|------------|------|------------|-----|------------|-----|------------|-----|-----|--------|--------|------------------------------|------|---|
|        | $^{\circ}$ | $'$  | $^{\circ}$ | $'$ | $^{\circ}$ | $'$ | $^{\circ}$ | $'$ |     |        |        | $\Delta z$                   | E    | W |
| +0     | 19         | 31.5 | 57         | 14  | 295        | 46  | 62         | 57  | -67 | +22    | -      | +4.5                         | +5.7 | - |
| 1      |            | 31.4 | 57         | 41  | 296        | 20  | 62         | 23  | -67 | +23    | -      | +4.5                         | +5.6 | - |
| 2      |            | 31.4 | 58         | 9   | 296        | 53  | 61         | 49  | -66 | +25    | -      | +4.6                         | +5.5 | - |
| 3      |            | 31.3 | 58         | 37  | 297        | 26  | 61         | 17  | -66 | +26    | -      | +4.7                         | +5.4 | - |
| 4      |            | 31.3 | 59         | 5   | 297        | 58  | 60         | 45  | -66 | +27    | -      | +4.8                         | +5.3 | - |
| 5      |            | 31.3 | 59         | 34  | 298        | 29  | 60         | 14  | -65 | +29    | -      | +4.9                         | +5.1 | - |
| 6      |            | 31.2 | 60         | 4   | 298        | 59  | 59         | 43  | -65 | +30    | -      | +4.9                         | +5.0 | - |
| 7      |            | 31.2 | 60         | 33  | 299        | 29  | 59         | 13  | -64 | +31    | -      | +5.0                         | +4.9 | - |
| 8      |            | 31.1 | 61         | 4   | 299        | 58  | 58         | 44  | -64 | +32    | -      | +5.1                         | +4.8 | - |
| 9      |            | 31.1 | 61         | 35  | 300        | 26  | 58         | 16  | -63 | +33    | -      | +5.2                         | +4.6 | - |
| 10     |            | 31.0 | 62         | 6   | 300        | 53  | 57         | 48  | -63 | +34    | -      | +5.2                         | +4.5 | - |
| 11     |            | 31.0 | 62         | 37  | 301        | 20  | 57         | 22  | -62 | +35    | -      | +5.3                         | +4.4 | - |
| 12     |            | 30.9 | 63         | 9   | 301        | 46  | 56         | 55  | -62 | +36    | -      | +5.4                         | +4.2 | - |
| 13     |            | 30.9 | 63         | 42  | 302        | 11  | 56         | 30  | -61 | +37    | -      | +5.4                         | +4.1 | - |
| 14     |            | 30.8 | 64         | 14  | 302        | 35  | 56         | 5   | -61 | +38    | -      | +5.5                         | +4.0 | - |
| 15     |            | 30.8 | 64         | 47  | 302        | 59  | 55         | 41  | -60 | +39    | -      | +5.5                         | +3.9 | - |
| 16     |            | 30.7 | 65         | 21  | 303        | 22  | 55         | 18  | -59 | +40    | -      | +5.6                         | +3.8 | - |
| 17     |            | 30.7 | 65         | 55  | 303        | 44  | 54         | 55  | -59 | +41    | -      | +5.7                         | +3.7 | - |
| 18     |            | 30.6 | 66         | 29  | 304        | 6   | 54         | 33  | -58 | +41    | -      | +5.7                         | +3.5 | - |
| 19     |            | 30.6 | 67         | 3   | 304        | 27  | 54         | 12  | -58 | +42    | -      | +5.8                         | +3.4 | - |
| +20    | 19         | 30.5 | 67         | 38  | 304        | 47  | 53         | 51  | -57 | +43    | -      | +5.8                         | +3.3 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$     | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|------------|------------|------------|--------------|--------------|
| $^{\circ}$ | m          | '          | '            | '            |
| +0         | +0.05      | -0.1       | -0.4         | -0.2         |
| 5          | 0.05       | 0.1        | 0.4          | 0.2          |
| 10         | 0.05       | 0.1        | 0.4          | 0.3          |
| 15         | 0.05       | 0.1        | 0.4          | 0.3          |
| +20        | +0.04      | -0.1       | -0.4         | -0.3         |

Pair No. 162  
 E 182  $\iota$  Pegasi 4.0  $\alpha_{1950}$   $\delta_{1950}$   
 $22^h 4^m 22^s$   $+25^{\circ} 6'$   
 W 141  $\delta$  Herculis 3.2 17 13.0  $+24^{\circ} 54'$

| $\phi$ | S          |      | z          |     | $A_E$      |     | $A_W$      |     | dz  | $dA_E$ | $dA_W$ | Var. for $\Delta\phi = +10'$ |      |       |   |
|--------|------------|------|------------|-----|------------|-----|------------|-----|-----|--------|--------|------------------------------|------|-------|---|
|        | $^{\circ}$ | $'$  | $^{\circ}$ | $'$ | $^{\circ}$ | $'$ | $^{\circ}$ | $'$ |     |        |        | $\Delta z$                   | E    | W     |   |
| +0     | 19         | 39.1 | 43         | 42  | 232        | 7   | 127        | 32  | -59 | -      | 49     | +                            | -6.1 | +8.3  | - |
| 1      |            | 39.1 | 43         | 5   | 232        | 58  | 126        | 42  | -60 | -      | 48     | +                            | -6.0 | +8.6  | - |
| 2      |            | 39.1 | 42         | 30  | 233        | 50  | 125        | 50  | -61 | -      | 47     | +                            | -5.9 | +8.8  | - |
| 3      |            | 39.1 | 41         | 55  | 234        | 44  | 124        | 56  | -61 | -      | 45     | +                            | -5.7 | +9.1  | - |
| 4      |            | 39.0 | 41         | 21  | 235        | 39  | 124        | 0   | -62 | -      | 44     | +                            | -5.6 | +9.4  | - |
| 5      |            | 39.0 | 40         | 48  | 236        | 37  | 123        | 3   | -62 | -      | 42     | +                            | -5.5 | +9.7  | - |
| 6      |            | 39.0 | 40         | 15  | 237        | 36  | 122        | 4   | -63 | -      | 41     | +                            | -5.3 | +10.0 | - |
| 7      |            | 39.0 | 39         | 44  | 238        | 37  | 121        | 3   | -64 | -      | 39     | +                            | -5.2 | +10.3 | - |
| 8      |            | 39.0 | 39         | 13  | 239        | 39  | 120        | 0   | -64 | -      | 37     | +                            | -5.0 | +10.6 | - |
| 9      |            | 39.0 | 38         | 43  | 240        | 44  | 118        | 56  | -65 | -      | 35     | +                            | -4.9 | +10.9 | - |
| 10     |            | 39.0 | 38         | 15  | 241        | 50  | 117        | 49  | -65 | -      | 32     | +                            | -4.7 | +11.2 | - |
| 11     |            | 39.0 | 37         | 47  | 242        | 58  | 116        | 41  | -66 | -      | 30     | +                            | -4.5 | +11.5 | - |
| 12     |            | 39.0 | 37         | 20  | 244        | 8   | 115        | 31  | -66 | -      | 27     | +                            | -4.3 | +11.8 | - |
| 13     |            | 38.9 | 36         | 55  | 245        | 20  | 114        | 19  | -66 | -      | 25     | +                            | -4.1 | +12.1 | - |
| 14     |            | 38.9 | 36         | 31  | 246        | 33  | 113        | 6   | -67 | -      | 22     | +                            | -4.0 | +12.4 | - |
| 15     |            | 38.9 | 36         | 8   | 247        | 48  | 111        | 50  | -67 | -      | 19     | +                            | -3.8 | +12.7 | - |
| 16     |            | 38.9 | 35         | 46  | 249        | 5   | 110        | 33  | -67 | -      | 16     | +                            | -3.5 | +13.0 | - |
| 17     |            | 38.9 | 35         | 25  | 250        | 24  | 109        | 15  | -68 | -      | 13     | +                            | -3.3 | +13.2 | - |
| 18     |            | 38.9 | 35         | 6   | 251        | 44  | 107        | 54  | -68 | -      | 9      | +                            | -3.1 | +13.5 | - |
| 19     |            | 38.9 | 34         | 38  | 253        | 6   | 106        | 32  | -68 | -      | 6      | +                            | -2.9 | +13.8 | - |
| +20    | 19         | 38.8 | 34         | 31  | 254        | 29  | 105        | 9   | -68 | -      | 2      | +                            | -2.7 | +14.1 | - |

Annual Precessions of S, z,  $A_E$ , and  $A_W$ .

| $\phi$     | $\delta S$ | $\delta z$ | $\delta A_E$ | $\delta A_W$ |
|------------|------------|------------|--------------|--------------|
| $^{\circ}$ | m          | '          | '            | '            |
| +0         | +0.05      | +0.1       | -0.4         | -0.2         |
| 5          | 0.05       | 0.1        | 0.4          | 0.2          |
| 10         | 0.05       | 0.1        | 0.5          | 0.2          |
| 15         | 0.05       | +0.1       | 0.5          | 0.1          |
| +20        | +0.04      | 0.0        | -0.5         | -0.1         |



TABLE II.

Pair No. 163  
 E 186 ζ Pegasi 3.6 22 39.0 +10 34  
 W 138 κ Ophiuchi 3.4 16 55.3 + 9 27

| φ   | S  |      | z  |    | A <sub>E</sub> |    | A <sub>W</sub> |    | dz  | dA <sub>E</sub> | dA <sub>W</sub> | Var. for Δφ = +10' |                 |                 |      |   |
|-----|----|------|----|----|----------------|----|----------------|----|-----|-----------------|-----------------|--------------------|-----------------|-----------------|------|---|
|     | h  | m    | °  | '  | °              | '  | °              | '  |     |                 |                 | Δz                 | ΔA <sub>E</sub> | ΔA <sub>W</sub> |      |   |
| + 0 | 19 | 47.6 | 44 | 30 | 254            | 49 | 103            | 32 | -73 | - 20            | +               | -2.5               | +               | 9.9             | -    |   |
| 1   |    | 47.5 | 44 | 15 | 255            | 49 | 102            | 33 | -73 | - 17            | +               | -2.3               | +               | 10.0            | -    |   |
| 2   |    | 47.4 | 44 | 2  | 256            | 49 | 101            | 33 | -73 | - 14            | +               | -2.1               | +               | 10.1            | -    |   |
| 3   |    | 47.4 | 43 | 50 | 257            | 50 | 100            | 32 | -74 | - 12            | +               | -2.0               | +               | 10.2            | -    |   |
| 4   |    | 47.3 | 43 | 38 | 258            | 51 | 99             | 30 | -74 | - 9             | +               | -1.8               | +               | 10.3            | -    |   |
| 5   |    | 47.3 | 43 | 28 | 259            | 54 | 98             | 28 | -74 | - 6             | +               | -1.6               | +               | 10.4            | -    |   |
| 6   |    | 47.2 | 43 | 19 | 260            | 56 | 97             | 25 | -74 | - 4             | +               | -1.4               | +               | 10.5            | -    |   |
| 7   |    | 47.2 | 43 | 11 | 261            | 59 | 96             | 22 | -74 | - 1             | +               | -1.3               | +               | 10.6            | -    |   |
| 8   |    | 47.1 | 43 | 4  | 263            | 3  | 95             | 18 | -74 | +               | 2               | -                  | -1.1            | +               | 10.6 | - |
| 9   |    | 47.0 | 42 | 58 | 264            | 7  | 94             | 14 | -74 | +               | 5               | -                  | -0.9            | +               | 10.7 | - |
| 10  |    | 47.0 | 42 | 53 | 265            | 11 | 93             | 9  | -74 | +               | 7               | -                  | -0.7            | +               | 10.7 | - |
| 11  |    | 46.9 | 42 | 50 | 266            | 15 | 92             | 5  | -74 | +               | 10              | -                  | -0.5            | +               | 10.7 | - |
| 12  |    | 46.9 | 42 | 47 | 267            | 20 | 91             | 0  | -73 | +               | 13              | -                  | -0.3            | +               | 10.8 | - |
| 13  |    | 46.8 | 42 | 46 | 268            | 24 | 89             | 55 | -73 | +               | 16              | -                  | -0.1            | +               | 10.8 | - |
| 14  |    | 46.7 | 42 | 46 | 269            | 29 | 88             | 50 | -73 | +               | 19              | -                  | +0.1            | +               | 10.8 | - |
| 15  |    | 46.7 | 42 | 46 | 270            | 34 | 87             | 45 | -72 | +               | 22              | -                  | +0.2            | +               | 10.8 | - |
| 16  |    | 46.6 | 42 | 48 | 271            | 38 | 86             | 39 | -72 | +               | 24              | -                  | +0.4            | +               | 10.7 | - |
| 17  |    | 46.6 | 42 | 52 | 272            | 43 | 85             | 35 | -72 | +               | 27              | -                  | +0.6            | +               | 10.7 | - |
| 18  |    | 46.5 | 42 | 56 | 273            | 47 | 84             | 30 | -71 | +               | 30              | -                  | +0.8            | +               | 10.7 | - |
| 19  |    | 46.4 | 43 | 1  | 274            | 51 | 83             | 26 | -70 | +               | 32              | -                  | +1.0            | +               | 10.6 | - |
| +20 | 19 | 46.4 | 43 | 8  | 275            | 54 | 82             | 21 | -70 | +               | 35              | -                  | +1.2            | +               | 10.6 | - |

Annual Precessions of S, z, A<sub>E</sub>, and A<sub>W</sub>.

| φ   | δS    | δz  | δA <sub>E</sub> | δA <sub>W</sub> |
|-----|-------|-----|-----------------|-----------------|
| 0   | m     | '   | '               | '               |
| + 0 | +0.05 | 0.0 | -0.5            | -0.2            |
| 5   | 0.05  | 0.0 | 0.5             | 0.1             |
| 10  | 0.05  | 0.0 | 0.5             | 0.1             |
| 15  | 0.05  | 0.0 | 0.5             | 0.1             |
| +20 | +0.04 | 0.0 | -0.5            | -0.2            |

Pair No. 164  
 E 183 θ Pegasi 3.7 22 7.7 +5 57  
 W 144 β Ophiuchi 2.9 17 41.0 +4 35

| φ   | S  |      | z  |    | A <sub>E</sub> |    | A <sub>W</sub> |    | dz  | dA <sub>E</sub> | dA <sub>W</sub> | Var. for Δφ = +10' |                 |                 |      |   |
|-----|----|------|----|----|----------------|----|----------------|----|-----|-----------------|-----------------|--------------------|-----------------|-----------------|------|---|
|     | h  | m    | °  | '  | °              | '  | °              | '  |     |                 |                 | Δz                 | ΔA <sub>E</sub> | ΔA <sub>W</sub> |      |   |
| + 0 | 19 | 54.7 | 34 | 19 | 259            | 23 | 98             | 8  | -74 | - 19            | +               | -1.7               | +               | 14.5            | -    |   |
| 1   |    | 54.6 | 34 | 10 | 260            | 50 | 96             | 41 | -74 | - 14            | +               | -1.4               | +               | 14.6            | -    |   |
| 2   |    | 54.6 | 34 | 2  | 262            | 18 | 95             | 13 | -75 | - 10            | +               | -1.1               | +               | 14.7            | -    |   |
| 3   |    | 54.5 | 33 | 56 | 263            | 47 | 93             | 44 | -75 | - 6             | +               | -0.9               | +               | 14.8            | -    |   |
| 4   |    | 54.4 | 33 | 52 | 265            | 15 | 92             | 15 | -75 | - 2             | +               | -0.6               | +               | 14.9            | -    |   |
| 5   |    | 54.3 | 33 | 49 | 266            | 45 | 90             | 46 | -75 | +               | 3               | -                  | -0.3            | +               | 14.9 | - |
| 6   |    | 54.2 | 33 | 48 | 268            | 14 | 89             | 16 | -75 | +               | 7               | -                  | -0.1            | +               | 14.9 | - |
| 7   |    | 54.1 | 33 | 48 | 269            | 44 | 87             | 46 | -75 | +               | 11              | -                  | +0.2            | +               | 14.9 | - |
| 8   |    | 54.0 | 33 | 50 | 271            | 13 | 86             | 17 | -74 | +               | 15              | -                  | +0.4            | +               | 14.9 | - |
| 9   |    | 53.9 | 33 | 53 | 272            | 42 | 84             | 47 | -74 | +               | 20              | -                  | +0.7            | +               | 14.8 | - |
| 10  |    | 53.9 | 33 | 58 | 274            | 11 | 83             | 18 | -73 | +               | 24              | -                  | +1.0            | +               | 14.8 | - |
| 11  |    | 53.8 | 34 | 5  | 275            | 39 | 81             | 50 | -73 | +               | 28              | -                  | +1.2            | +               | 14.6 | - |
| 12  |    | 53.7 | 34 | 13 | 277            | 6  | 80             | 22 | -73 | +               | 31              | -                  | +1.5            | +               | 14.5 | - |
| 13  |    | 53.6 | 34 | 22 | 278            | 33 | 78             | 55 | -72 | +               | 35              | -                  | +1.7            | +               | 14.3 | - |
| 14  |    | 53.5 | 34 | 33 | 279            | 58 | 77             | 28 | -71 | +               | 39              | -                  | +2.0            | +               | 14.2 | - |
| 15  |    | 53.4 | 34 | 46 | 281            | 23 | 76             | 3  | -71 | +               | 43              | -                  | +2.2            | +               | 14.0 | - |
| 16  |    | 53.3 | 34 | 59 | 282            | 47 | 74             | 39 | -70 | +               | 46              | -                  | +2.4            | +               | 13.8 | - |
| 17  |    | 53.2 | 35 | 15 | 284            | 9  | 73             | 16 | -69 | +               | 49              | -                  | +2.6            | +               | 13.6 | - |
| 18  |    | 53.1 | 35 | 31 | 285            | 29 | 71             | 54 | -68 | +               | 52              | -                  | +2.9            | +               | 13.3 | - |
| 19  |    | 53.0 | 35 | 49 | 286            | 48 | 70             | 34 | -67 | +               | 56              | -                  | +3.1            | +               | 13.1 | - |
| +20 | 19 | 52.9 | 36 | 9  | 288            | 6  | 69             | 15 | -66 | +               | 59              | -                  | +3.4            | +               | 12.8 | - |

Annual Precessions of S, z, A<sub>E</sub>, and A<sub>W</sub>.

| φ   | δS    | δz   | δA <sub>E</sub> | δA <sub>W</sub> |
|-----|-------|------|-----------------|-----------------|
| 0   | m     | '    | '               | '               |
| + 0 | +0.05 | 0.0  | -0.5            | -0.1            |
| 5   | 0.05  | 0.0  | 0.5             | 0.1             |
| 10  | 0.05  | 0.0  | 0.5             | 0.1             |
| 15  | 0.05  | 0.0  | 0.5             | 0.1             |
| +20 | +0.04 | -0.1 | -0.5            | -0.1            |