

(c') Obtain the ratio of  $V_2$  to  $V_1$  from the formula of Adams, or more simply from the curve representing the change of linear velocity with latitude.

(d') The final velocities  $V_1$  and  $V_2$  can then be obtained from the formula

$$V_1 \cos \gamma_1 + V_2 \cos \gamma_2 = 2 \left( v + \frac{r}{R} s \right)$$

It may be seen by comparing the residuals in Table IX, Section 19, that they are practically the same for the three reduced values of each observed value obtained by the two methods of reduction, and it is therefore immaterial so far as accuracy is concerned which is employed. Both have been carried through in this investigation for the sake of comparison and to determine which is the more suitable.

#### SUMMARY OF MEASURES.

13. It is impossible within the limits of this paper to give the separate measures for each spectrum, and so in the succeeding tables a summary of the measures and other necessary data are given. In series I the 19 lines given in the preceding tables were measured on 14 of the 19 plates. On the remaining 5 plates, 8 of the best defined lines only were measured. This number was reduced to diminish the great labor of measurement and because the measures of the 14 plates had shown that, as will be seen later, any differences in rotational value for different elements were accidental in character. Furthermore, even with the reduced number of lines, the probable error of a plate as determined from the internal agreement among the lines was on the average less than half the probable error obtained from the measures of different plates. In series II, however, owing to the much higher probable error of measurement all the lines were measured throughout and in series III also on account of the systematic differences previously found for the different lines by Adams.

In these summaries  $\varphi_1$ ,  $\varphi_2$  and  $V_1$ ,  $V_2$  represent as above the latitudes and velocities at the observed points on the disc of the sun, while  $\varphi$  and  $V$  are the latitudes and velocities at the points radially projected through the observed points to the limb.