the lines are of much better quality for measurement than at λ 5600. When the probable errors (in kilometres) are reduced to linear measure they become more than twice as great at λ 5600 as at λ 4250. The probable errors for a single line obtained at Mt. Wilson are

$$\text{p. e.} = \pm\ 0.015 \text{ km. per sec.} \quad (1906\text{-}7).$$
$$\text{p. e.} = \pm\ 0.009 \quad ,, \quad ,, \quad ,, \quad (1908)$$

The Ottawa value as above stated is $\pm$ 0.015. It must not be forgotten, however, that the Mt. Wilson values are from one or two plates, the Ottawa from the mean of all the plates; On the Mt. Wilson plates the lines giving, systematically, velocities differing from the mean were excluded, on the Ottawa plates these and all lines were included; and lastly that the Mt. Wilson linear dispersion was in 1906-7, 10 per cent. and in 1908 30 per cent. greater than the Ottawa. Hence it is evident that the probable error of measurement is about the same at the two places. Although the probable error of a plate determined from the agreement among the plates is not given, it is readily computed, and for the equator (1908) is $\pm$ 0.011 km. per sec. as compared with $\pm$ 0.018 here. This is considerably smaller, but yet about 5 times that obtained from agreement among the lines.

28.   It is evident from the ratios of the probable errors that a great many more lines than necessary for the actual determination of the rotation have been measured, and that it would be preferable to measure four or five times as many plates with only one fourth or fifth the number of lines, and that even then the probable error obtained from comparison of the plates would be twice that deduced from the internal agreement of the lines.   However, in this investigation a larger number of lines was measured for the purpose of determining whether different elements and different lines of the same element give different velocities of rotation.

SYSTEMATIC DIFFERENCES OF VELOCITY FOR DIFFERENT ELEMENTS.

29.   Considerable attention has been devoted to this phase of the investigation which is of importance not only because of its interest in the theory of the sun, but also because it was one of the questions proposed by the Rotation Committee, and because Adams has found some small systematic differences for different elements and his results should be confirmed.

As previously mentioned in the λ 5600 region the lines were chosen particularly with this point in view and include as large a number of elements as is possible among the limited number avail-