

SIR AUREL STEIN'S PERSONAL OBSERVATIONS  
WITH ANEROID No. 5579, IN FEBRUARY TO MAY, 1915.

These observations were overlooked until January 1924 after the bulk of the heights of the expedition had been reduced. Further, aneroid No. 5579 had not been compared with any standard barometer. Accordingly the first step in reducing the observations made with it was to determine its zero error so far as this could be done by comparison with results obtained by other instruments at identical stations.

There are seven stations at which aneroid No. 5579 was used whose height has otherwise been determined: and the comparative results lead to a correction,  $-0.23$  inch, being adopted (see first table). The Director General of Observatories kindly supplied the following data.\*

1. Pressure and temperature at 8 A.M. and maximum and minimum temperatures, observed at Kāshgar daily from 15th February to 15th May 1915.
2. The average diurnal variation in pressure at Yārkand
  - (a) for months November-February,
  - (b) for months March-May.
3. The average diurnal variation in pressure estimated for the Tarim basin as the mean of the corresponding quantities at Lahore and Irkutsk.

The remaining data were Sir Aurel Stein's aneroid pressures, with temperature of air and hours and dates of observations. Two processes of reduction became available.

- (a) To reduce the Kāshgar observations to the moment of each individual observation of Sir Aurel Stein, applying the Yārkand diurnal variation. In this case the simultaneous temperature at Kāshgar is not known, but that at Sir A. Stein's station is known.
- (b) To reduce Sir A. Stein's observations to 8 A.M., applying the mean (Lahore + Irkutsk) diurnal variation. In this case the simultaneous temperature at Sir A. Stein's station is not known but that at Kāshgar is known.

Both methods have been employed.

As only one station temperature is known in either case it is necessary to utilise an average temperature lapse which was taken to be  $3^{\circ}$  F. per 1000 feet. Each method (a) and (b) then give a difference of height from Kāshgar: and the mean of these two values—which agree satisfactorily—may be considered a good representation of the aneroid observations.

Most of Sir A. Stein's observations were taken within 2 hours of 8 A.M. There are two others, taken at 9 P.M. (Yangi-hissār) and 9.30 P.M. (Arpishme) and for these the mean of Kāshgar 8 A.M. readings for two successive days were employed. These two results have been treated as of half the weight of any of the other observations in deducing the mean correction to be applied to the aneroid, on the ground that there is likelihood of the variation of the barometric pressure being less accurately allowed for owing to the greater time interval. Indeed the Arpishme result shows the greatest discrepancy from the mean value of the correction.

For the purpose of this comparison the height of Kāshgar was taken to be 4043 feet: but as the resulting heights are all in the same terms it is clear that the only effect in changing this value for Kāshgar would be to modify the aneroid correction accordingly. In other words the deduced correction  $-0.23$  inch may be regarded as made up of the actual aneroid error combined with the result of any inaccuracy in the value of height of Kāshgar employed.

\* In a later letter dated 7th March 1924, the Director General wrote "I find that the only available Russian data for 1915 are those for the extreme east of Siberia—the Vladivostock region".