

APPENDIX B

NOTES ON HEIGHT OBSERVATIONS

MADE DURING SIR AUREL STEIN'S EXPLORATIONS

1900-01, 1906-08, 1913-15

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THE BAROMETRIC AND HYPSONETRIC HEIGHTS

Numerous readings of mercury barometers, aneroid barometers and hypsometers were made by the surveyors who accompanied Sir Aurel Stein on his three journeys—1900-01, 1906-08 and 1913-15. The results of the mercury barometers are satisfactory, those of the aneroids are surprisingly so, seeing that all aneroids are subject to erratic changes; but the hypsometer results have proved to be worthless. Hence only heights derived from mercurial or aneroid barometer readings have been shown in the maps recording these surveys.

At places where all three instruments have been observed, the aneroid has rarely differed from the mercury by as much as 200 feet; while the range of variation of the difference of mercury barometer and hypsometer attains a maximum of about 2000 feet. This is the more disappointing when the very large number of hypsometer readings taken on these journeys is considered. This failure of the hypsometer height results must be attributed to improper use of the instrument, such as

- (1) not allowing the water to boil properly and accordingly getting too low a reading, resulting in too great a height deduced;
- (2) immersing the bulb of the thermometer in the water, instead of seeing that it is wholly in the steam above;
- (3) blunders in reading.

The first of these faults can be avoided by allowing the heating to go on after the water is believed to be boiling, and seeing whether any further rise of the mercury occurs; then booking the highest reading. If the second fault is avoided it is a matter of indifference whether the water is pure or not. Blunders should only be rare if the graduations of the thermometer are rubbed over with lamp black when they become faint.

At the time that the readings of the first two journeys were reduced, the view prevailed in the Survey of India that hypsometric results were not trustworthy, and these hypsometric results were abandoned without seeking for any further reason. While I am confident that good results may be obtained with the hypsometer, I have had to reject the results of the 1913-15 journey, because comparison with the mercury barometer results show them to be quite unreliable.