

expense of introducing more angles. The object of the preliminary is to form a base for the topography, so that the location may be correctly projected.

When following down a suspended grade, the Engineer will note the probable curvature of the located line, and compensate his preliminary grade to suit; the compensation is generally 0.05 and runs in mountainous country to 0.2.

In very rough, steep side hill, especially in ravines where a line must be carefully fitted, two or more preliminary lines should be run, and tied together, this will serve as a frame work for the topography, and different locations may be accurately projected. The practice of running lines near each other and plotting on separate plans must be avoided.

At critical points where the maximum curve will be inserted, the deflection on the preliminary should be figured to suit, and short chords used.

Compass lines will be used only when considerable time and clearing can be saved. This is not the case if the level limits speed of party. Compass readings must always be taken as a check in transit work.

All courses of the line, both true and magnetic, must be taken, the former only being noted on plans.

To obtain true north, an observation of the north star should be taken when starting survey, and additional observations for correcting meridinal divergency when the survey shall attain a departure of one-half degree of longitude.

To illuminate cross wires at night, wrap a piece of tracing linen around the object end of telescope, so that one-half of object glass is loosely covered. This linen may be secured by rubber band, then illuminate by lantern from one side.

A good night foresight may be had by marking an X on tracing linen tacked over box with a candle or lantern behind it. On small surveys the true north may be assumed by deflecting from magnetic readings.

Plot all lines by latitudes and departures.

By reversing telescope on alternate angles cumulative errors may be nullified.