## EXPLANATION OF THE GEODETIC TABLES.

The elements of the figures of the earth on which these tables are based are those given by Capt. A. R. Clarke in his "Comparisons of Standards of Length, &c., 1866."

These elements are:—

Equatorial semi-axis = a = 6378206·4 metres.

Polar semi-axis = b = 6356583·8 metres.

His value of the metre (which has also been used) is 39·370432 inches.

### TABLE I.

The first column of this table gives the argument—the latitude of the place.

From the second column with this argument we take out the logarithm of the length of in Gunter's chains N sin 1″, *i.e.*, of one second (1″) of the great circle of the earth perpendicular to the meridian at that place.

The third column gives the logarithm of the length in chains of P sin 1″, *i.e.*, of one second (1″) of longitude.

The fourth column gives the logarithm of R sin 1″, *i.e.*, of one second (1″) of latitude.

These values have been used in computing the following tables.

### TABLE II.

The argument in this table is the number of the base or correction line, or (in the first column) the number of townships intervening between the 49th parallel of latitude and the line.

The next column contains the latitude of the line, and the next three columns give log N sin 1″, log P sin 1″, and log R sin 1″ as before,

The last column of the table gives the difference of longitude between two points on the line 489 chains apart.

For interpolating, in this table and in Table I, the logarithm of N sin 1″, P sin 1″, and R sin 1″, for any latitude intermediate between the latitudes given in the table, N sin 1″ and r sin 1″ may be interpolated directly, in the usual way, by first differences. But to obtain P sin 1″ for an intermediate latitude, it is necessary, if accuracy is required, to first interpolate N sin 1″ for the latitude, and then to multiply the result by the cosine of that latitude.

For P sin 1″ = N. sin 1″ $\times$ cos $\phi$.

### TABLE III.

This table gives for the argument—number of the base line: first, the chord azimuth, *i e.*, the angle measured from the north towards the west which a township chord makes with the meridian, in degrees, minutes and seconds. In the next column is given the chord azimuth, in degrees and decimals of a degree.

The two columns headed "Deflection" give the angle between one chord produced and the next chord; or 180° less twice the chord angle. One column gives it in minutes and seconds, and the other in decimals of a degree. The "Deflection Offset" is the angle subtended by this deflection angle at a distance of one chain. By means of it the deflection angle may be turned off without any reading of the angle on the instrument. Thus, suppose we are running on the 6th Base and come to a township corner. The instrument say, is 15 chs. back (east) from the corner, and a picket is planted forward on the chord produced at a distance of say 10 chs. beyond the corner. Then, to lay off the angle—take from the table for the 6th Base the deflection offset 1·4930 inches. Then plant the back-picket 1·4930 $\times$ 15 = 22·4 inches to the south of the instrument station. Carry the instrument forward and set it up over a point 1·4930 $\times$ 10 = 14·9 inches north of the foresight, and produce the line forward from the backsight.