

The Latitude Stars.— We have δ and t at once from (b) and a is readily obtainable.

With these data, an inspection of the *British Nautical Almanac*, or *American Ephemeris* will give the stars. With any ordinary transit, stars up to the fourth magnitude should be observed without any difficulty, and in a dry atmosphere, or high altitude, the list may be extended to take stars up to the fifth magnitude.

It remains to calculate by (1), (2), and (3) the μ and A of each of the stars selected. Five-figure logarithms are sufficient.

THE OBSERVATION.

1. Set up and level the instrument very carefully. The sun shade will be found a convenience in preventing the dew from gathering on the object glass. Set the telescope at an altitude equal to ϕ_0 and clamp firmly. Then by means of screw "Y" bring the latitude level to the middle of its run. Since this level is much more sensitive than the plate levels, it is as well now to revolve the instrument in azimuth over the parts of the circle which will be used for the observation and see if the level remains fairly steady in the middle. If not, relevel until it does, as it is desirable to make the level correction as small as possible. Shortly before the first star is expected, set for it in azimuth and clamp. If, when the star is seen in the field, it appears that it will not cross the horizontal wire at the computed time, as a matter of convenience, the altitude may be altered by screw "X" to make it do so, but after the first star, screw "X" must on no account be touched at all until the whole observation is complete. The reason for the star not crossing the horizontal wire at the computed time may be an inaccurate telescope setting or a wrong assumption of the watch error, but this will not affect the accuracy of the results. If the star appears to be moving in such a manner that it will not pass near the intersection of the wires, the azimuth slow-motion screw may be used at any time.

2. Observe the times of transit across the horizontal wire, moving the azimuth screw so that the star crosses near, but not quite at the centre.

3. Read the latitude level as quickly as possible, after each transit, being careful to keep the warm breath or heat from the reading lamp away from the level.

COMPUTATION.

By means of the bubble we have observed the transit of a number of stars over the horizontal wire at some one definite zenith distance, the accuracy of which depends upon the sensitiveness of the bubble.

From the prime vertical stars, we shall first find the quantity