

## A PENDULUM ASTROLABE

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### **Description.**

A pendulum astrolabe is a fixed-angle instrument used to determine when a celestial body attains a certain altitude. With the 60° pendulum astrolabe, this altitude is approximately equal to 60°. A flat, pendulum-suspended mirror is used as the horizontal plane, while conventional instruments use level vials or mercury. This instrument requires only approximate leveling because the light rays from the star pass through the objective lens of the telescope and are reflected to the reticle by the horizontal mirror. To allow the instrument to be turned horizontally to any desired azimuth, the telescopic device and its parts are mounted on an azimuth circle and a spindle system. A conventional transit or theodolite-type base is used. The base has four leveling screws for approximate leveling against two level vials set at right angles to each other on the plate. The astrolabe is ordinarily attached to a tripod but can be set up on a pier or similar sturdy base. The instrument has a low-power finder telescope to assist in locating and identifying desired stars. The astrolabe weighs 18 pounds alone and 37 pounds with tripod and carrying case. (Figure.)

### **Purpose.**

Latitude and Longitude are ordinarily determined from data computed after observing several stars, the altitude of each star being computed from time data corrected by radio time signals, an assumed latitude and longitude, and the apparent position of the star. The pendulum astrolabe speeds up this computation by determining swiftly and simply the time at which selected stars pass a circle or several circles of equal altitude near 60°. No vertical angles are read because the angle of the instrument is fixed at an angle of approximately 60° and all stars are observed at the same altitude. This reduces the observing time for each star and increases the accuracy of the observation by eliminating possible errors in reading measured angles.

