Setting Circles Lab

Purpose: To be able to find unknown stars from their published positions.
Procedure: (Equipment needed: Planisphere, Brightest Stars list, Red Flashlight)

In the classroom: Preparation

1) Check your planisphere for the correct time and date to establish which stars are possible to see. The outermost ring of the planisphere is a right ascension circle, listed in hours. Note the Eastern and Western horizon limits in the planisphere's field of view. Notice the right ascension limits of both these horizons.

   For example: At 8:00 P.M. on June 30, the FOV shows constellations from Lacerta, Sagitta and Aquila on the Eastern Horizon to Lynx, Cancer and Hydra on the Western Horizon. Drawing a line downward through these three Western constellations to the outer circle of the planisphere crosses the right ascension scale at about 9hr 30 min. Similarly, on the Eastern horizon, such a line crosses the scale at about 19 hr 30 min. Thus, at this date and time we can only see stars between RA's of 9 hr 30 min and 19 hr 30 min. (This will change as time moves on.) Try to avoid these extremes. They will be stars low on the horizon and hard to see.

2) Look at your "Brightest Stars" list. (Nortons, P.136)They are listed according to their RA's. You will be picking stars that fall between your limiting RA's, as established above. In the example above, your choices will fall between the stars Alphard (RA 9hr 27 min) and Albireo (RA 19 hr 30 min.)

3) Select 6 stars that fall between these RA limits. (The more prominent stars have Arabic names printed on the far right of the list. These might be good choices. Stars with lower "V" will be brighter stars and easier to find in your Telrad.) Try not to pick double stars which have an "A" or "B" after their star name in the left column. These will be harder to determine colors.

4) On a sheet of paper, that you will take to the telescope, write down the stars: Identification, RA and Dec and V, taken from your printed list. Use this instead of the long list while on the roof. In addition, write down the coordinates of a prominent star that you can find without help, Sirius, for example. This will be your calibration star.

On the roof: Alignment, Calibration and Observation

1) Use the 26mm eyepiece. Set up your telescope and rough-align on Polaris as usual. Align your Telrad with your telescope. This is a very important step. Make sure that what you see in your telescope is centered in the Telrad or all the rest will become very difficult. Your telescope is now aligned.

2) Turn your telescope to your calibration star manually. Center it in both your telescope and Telrad. Check your declination circle agrees with the data you wrote down for this star. If it is very far off, ask an assistant for help. Set your RA circle to the published RA of that star and turn on your electric clock drive. Your telescope is now calibrated. (This calibration star doesn't count for one of your six stars.) The lab starts now.

3) Select the first star on your list. Turn the telescope until the RA under the little index agrees with your printed RA. (Each little mark is 5 mins.) Adjust the telescope's Dec until it agrees with your published Dec. (There are no +/- marks on the Dec scale. You have to know that bringing the telescope upwards moves you into a more positive Dec.)

4) Look in your Telrad for a bright star. It probably won't be centered. Center it in your Telrad. It should now be in your telescope's FOV. Center it there. Slightly de-focus the star to spread out its light a bit and estimate its color. (The choices are: Blue, White, Yellow, Orange or Red. Your guess can't be wrong. Put down what you see.) Write this down on your sheet. Refocus the star sharply in preparation for the next star.

5) Repeat steps 3) and 4) for the next five stars on your list.

At home: Publication of Results

1) Type up your list of six stars as follows: (This is an example.)

Star	RA	Dec	Mag	MK Type	Color Guess
Alpheratz	00 08	+59.09	2.07	B9	Blue

(Get the MK Type from your "Brightest Star" list; just the letter and number.)