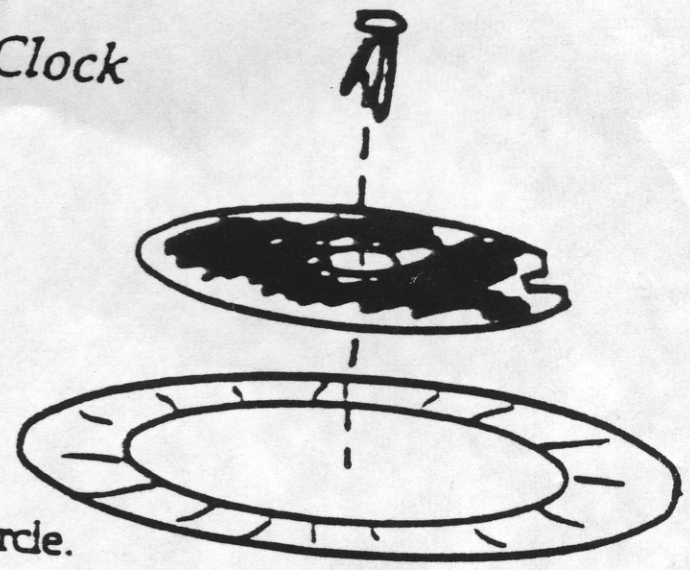
Instruction Sheet:
How to Make and Use a Star Clock



Indoors—Making the Star Clock

1. Cut out the two circles with a pair of scissors.

2. Cut out the notch on the small circle.

3. Use a paper punch to make a hole in the center of the small circle.

4. Place the small circle on top of the large circle. Push a large paper fastener down through the center of both circles, and spread open the fastener on the back side of the Star Clock.

Outdoors—Using the Star Clock

1. Find the Big Dipper and the North Star, as shown on the face of your Star Clock.

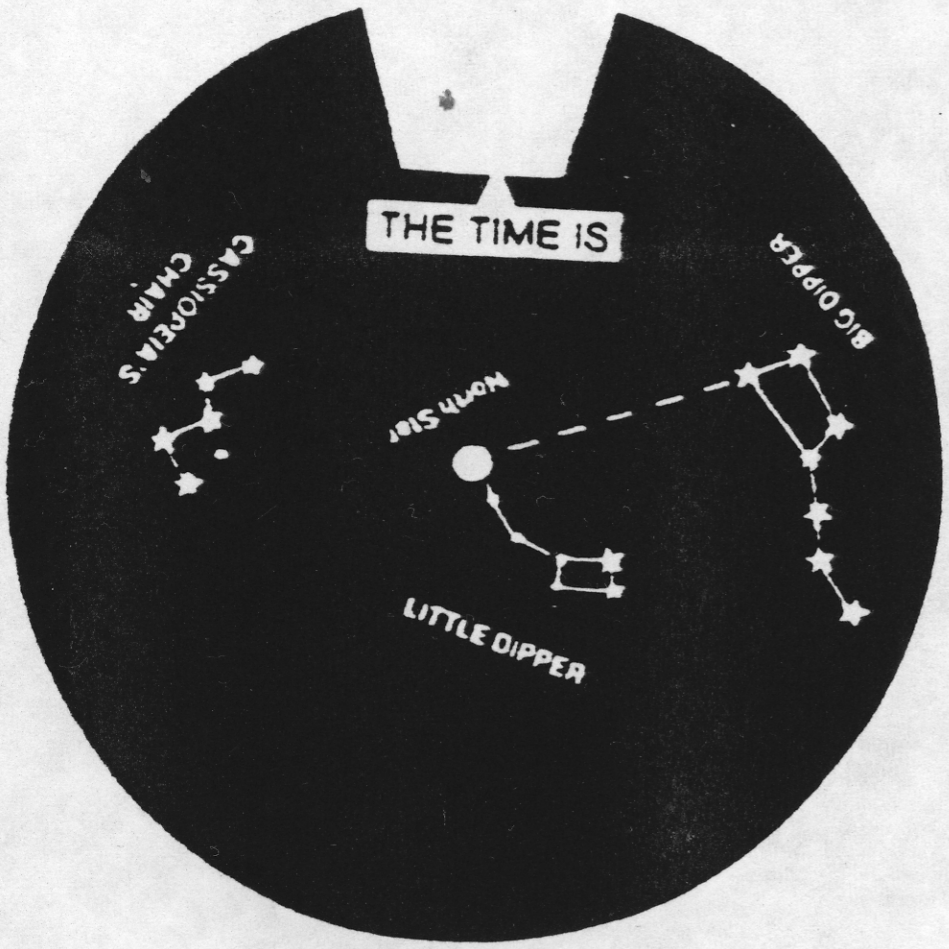
2. Face the North Star, as shown on the front of the clock.

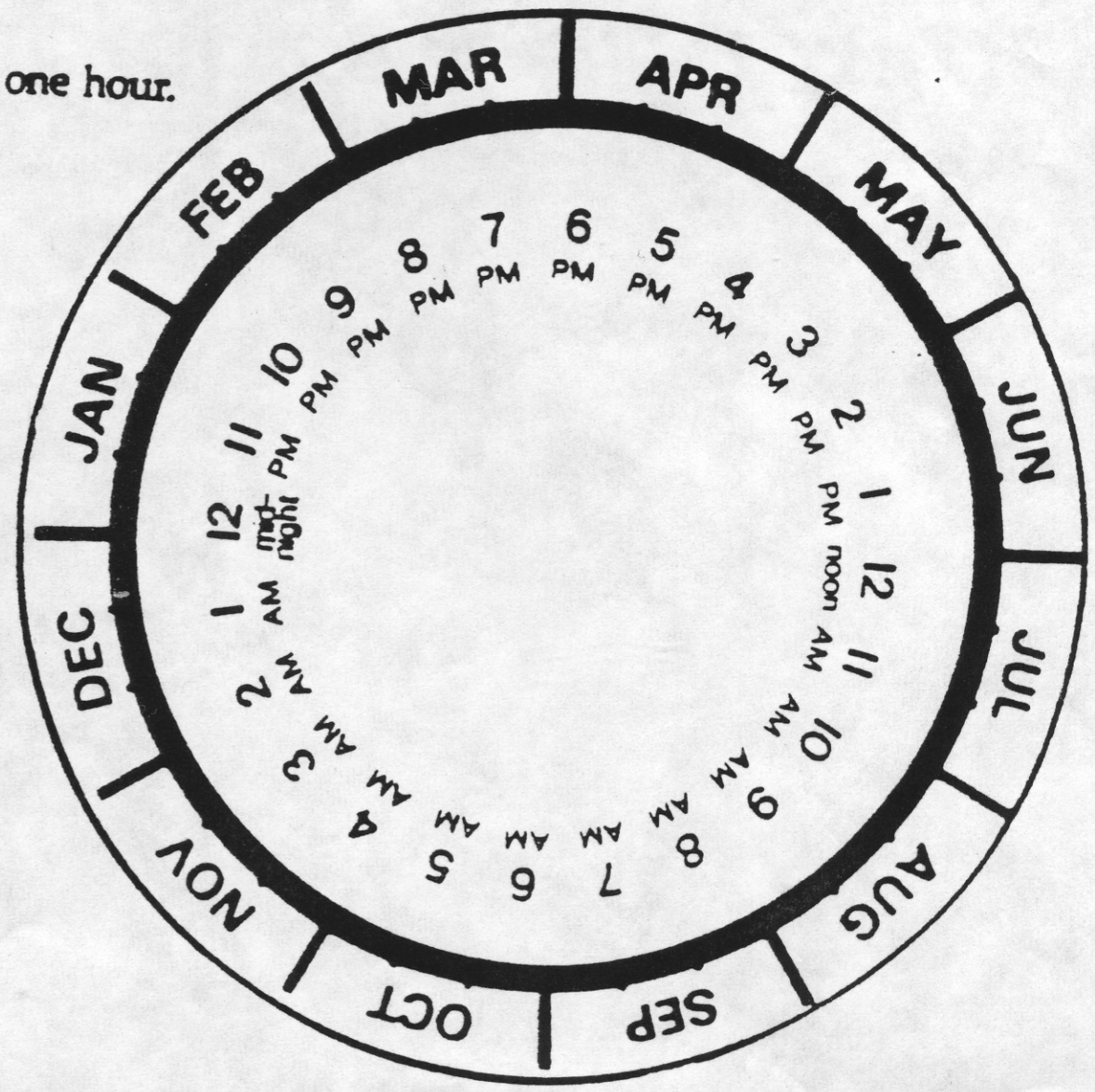
3. Find the current month around the outside circle of the Star Clock. Put your thumb over the current month. Hold your Star Clock so the current month, marked by your thumb, is AT THE TOP.

4. Holding the large disk firmly with the current date at the top, turn the smaller disk until its stars line up with those in the sky.

5. Read the time in the window.

6. If you are on Daylight Savings Time, add one hour.





BRIEF GUIDE TO OBSERVATIONAL AIDS

David C. Leake
William M. Staerkel Planetarium - Parkland College

Abrams Planetarium Sky Calendar: An excellent, one-page publication that gives you all the information for the current month that is needed for naked eye observation. On one side is a star map showing the major constellations while the other side is a calendar pictorially showing any events of interest. A steal at $8 per year! (Abrams Planetarium, Michigan State University, East Lansing, MI 48824)

Burnham's Celestial Handbook: A 3-volume set covering all 88 constellations individually with lists of variables, doubles, deep-sky objects and text for objects of interest. The bright stars are also included in the commentary along with poetry and mythology. A must for any serious amateur.

A Complete Manual of Amateur Astronomy: Written by P. Clay Sherrod, this book covers many projects that an amateur can pursue with a telescope. Many tables and charts accompany chapters on telescope set-up, alignment, observation of meteors, comets, the planets, and astrophotography. Emphasis is applied to simple observations that are of use to professional organizations.

A Field Guide to the Stars & Planets: Contains photographic charts of the entire sky in addition to drawn charts. Full of detailed information on objects to observe plus the moon. Written by Donald Menzel.

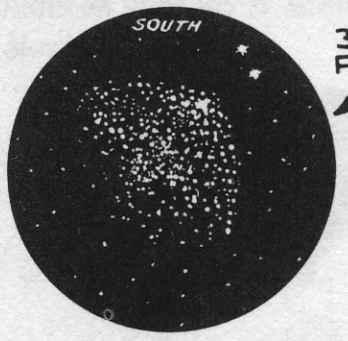
Observing the Night Sky with Binoculars: You would be surprised on how much you can see with a simple pair of 7x50mm binoculars! This book is an introduction with sections on the stars, the moon, planets, comets, with lists of targets to observe. An excellent book by Patrick Moore.

Star Maps for Beginners: A detailed depiction of the constellations with a description of each detailing what you can see. A good introduction to the sky, with sections on the planets and deep-sky objects. Compiled by Levitt & Marshall.

Sky & Telescope and Astronomy: The two most popular periodicals among amateur astronomers. "S & T" is more expensive and covers more scientific topics. "Astronomy" has terrific pictorials and is more for the novice. Both will give you complete coverage of monthly sky events, planet location, a star chart for the month, and well written articles. Both can be received at a discount through local astronomy clubs.

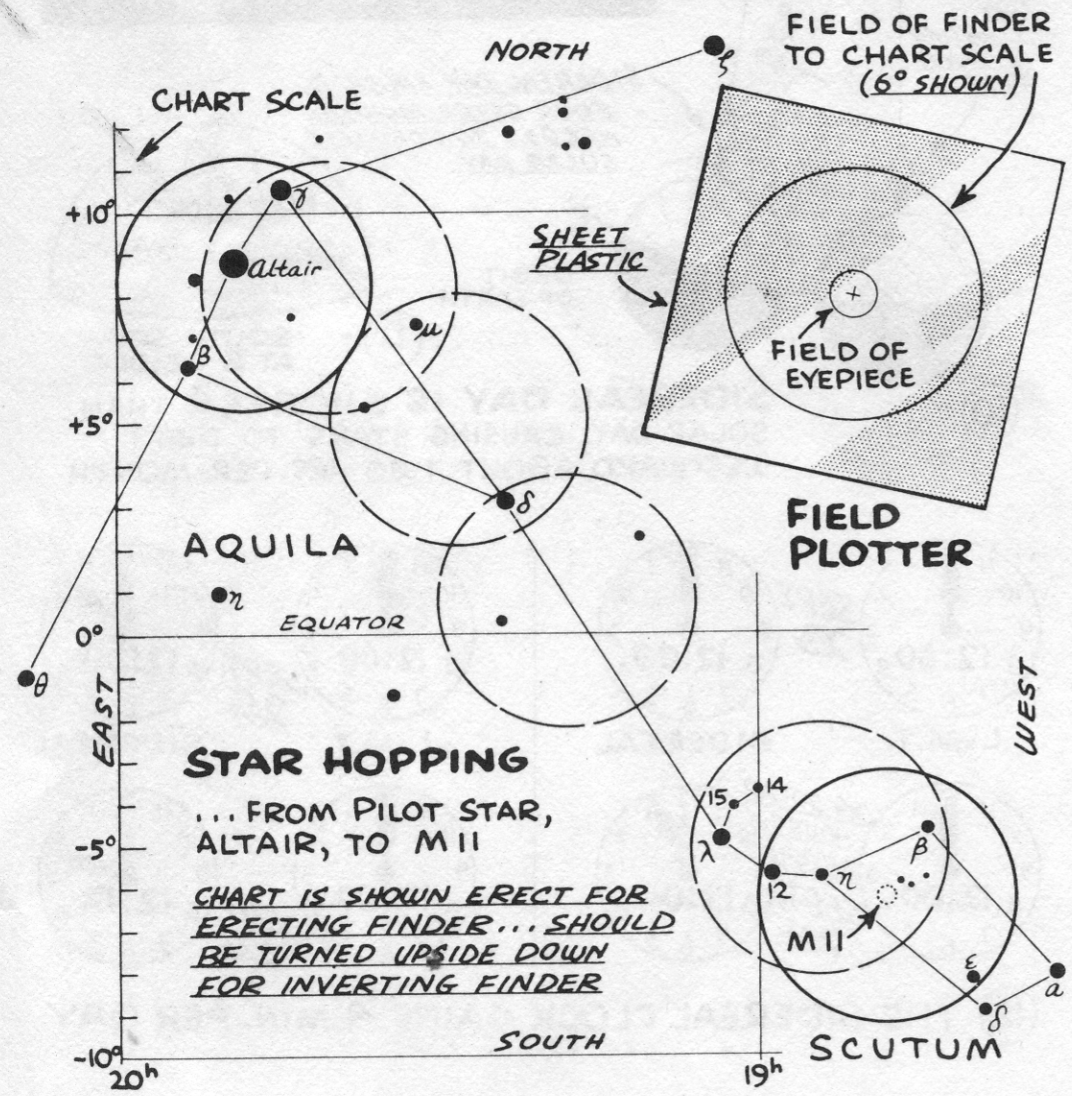
Star & Satellite Path Finder: A rotating star chart that can be set for the exact date and time you are observing. An accurate depiction of the sky is then provided. Very inexpensive and quite useful. A listing of the planets, zodiacal constellations, bright stars, and major meteor showers is also includes with an instruction booklet. Purchased from Edmund Scientific Company.

how to FIND Sky Objects



M11 - OPEN CLUSTER

MANY TINY STARS GIVE A GLOWING EFFECT. EASY TO SEE WITH 3 TO 6" AT 40x



VARIOUS methods are used in locating sky objects with a telescope, ranging from coarse naked-eye sighting to precise pin-pointing with the use of setting circles. All methods require a good mount--it must not vibrate unduly, it must "stay put" at any position and it must work smoothly on both axes. Other requirements are a planisphere and a star atlas. The planisphere is used to determine the general aspect of the sky; the atlas then supplies the detail maps. Don't expect to find sky objects by random sweeping--you must know exactly what you are looking for and how to get there.

STAR HOPPING. This is the finding method most used by beginners. The idea is that you hop from a bright star you know to another star you know, etc., and in this way reach your target, which may be invisible to the naked eye. An important part of this technique is careful plotting of the course on a star atlas. Make a "field plotter" of clear plastic as shown in drawing, scaled to the degree marks which you will find at the edge of all atlas maps. If you don't know the field of your finder, find it by the method shown in boxed drawing below.

Now, let's plot the route to a typical telescope object, such as M 11. Altair will be your pilot star or starting point. Note in drawing that a 6-degree finder field will take in the two guard stars, which will make identification positive when you locate Altair in the sky. Move the field plotter, keeping Altair in field but stretching out to another star along the route. This will be Mu, as shown. Keeping Mu in the field, you can reach Delta. From Delta to Lambda you will have a little bit of blind hop, but it will not be hard to pick up the curved string of stars ending at the top of Scutum (SKYOU-tum), the Shield. Below Eta and Beta in Scutum you will find three faint stars, and about half degree east and south is M 11.

Note that the general direction of your route is west and south. The drawing shows the stars as they appear in a naked-eye view facing south. If your finder is the usual inverting type, all this will be upside down. Hence, turn the drawing (or atlas) upside down and it will then agree with the view you will see later in the eyepiece of the finder. Memorize each step of the route; call out each star by

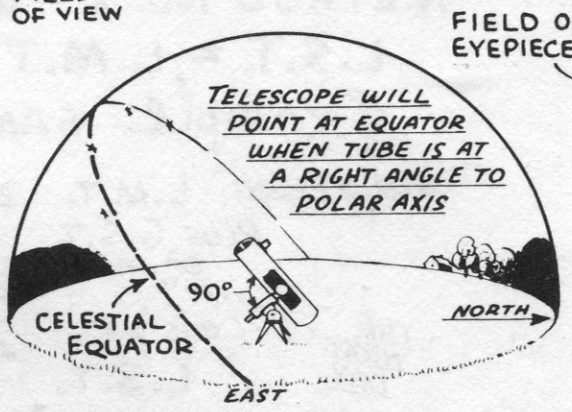
FIELD OF A TELESCOPE

Here's the Idea:

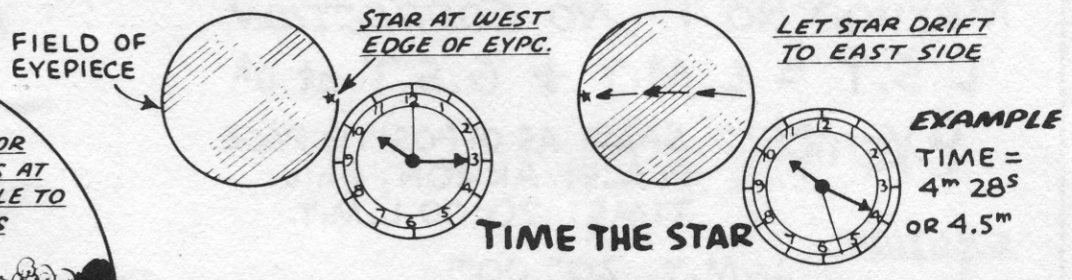
A STAR ON OR NEAR THE EQUATOR MOVES WESTWARD AT THE RATE OF FIFTEEN DEGREES PER HOUR...

EQUALS 1° IN 4 MINUTES OR 15' IN 1 MINUTE

BY TIMING THE PASSAGE OF THE STAR ACROSS THE FIELD OF VIEW, YOU CAN DETERMINE THE ANGULAR FIELD OF THE TELESCOPE



SIGHT ANY EQUATORIAL STAR



TIME THE STAR

THEN: DIVIDE TIME IN MINUTES BY 4 TO GET FIELD IN DEGREES

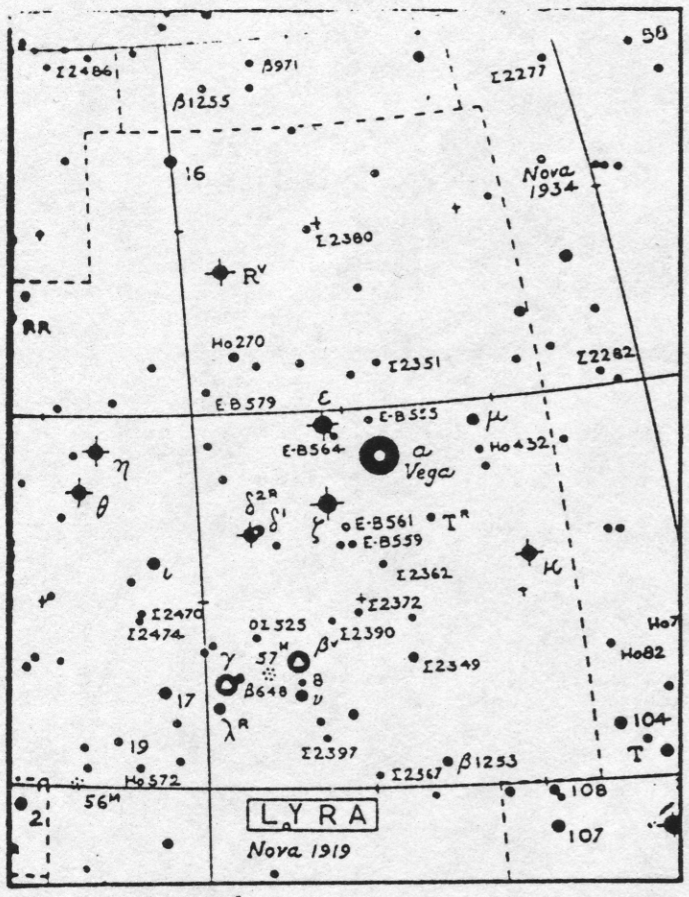
EX: $4\overline{)4.5}$ = 1.1° APPROX.

OR: MULTIPLY TIME IN MINUTES BY 15 TO GET FIELD IN MINUTES

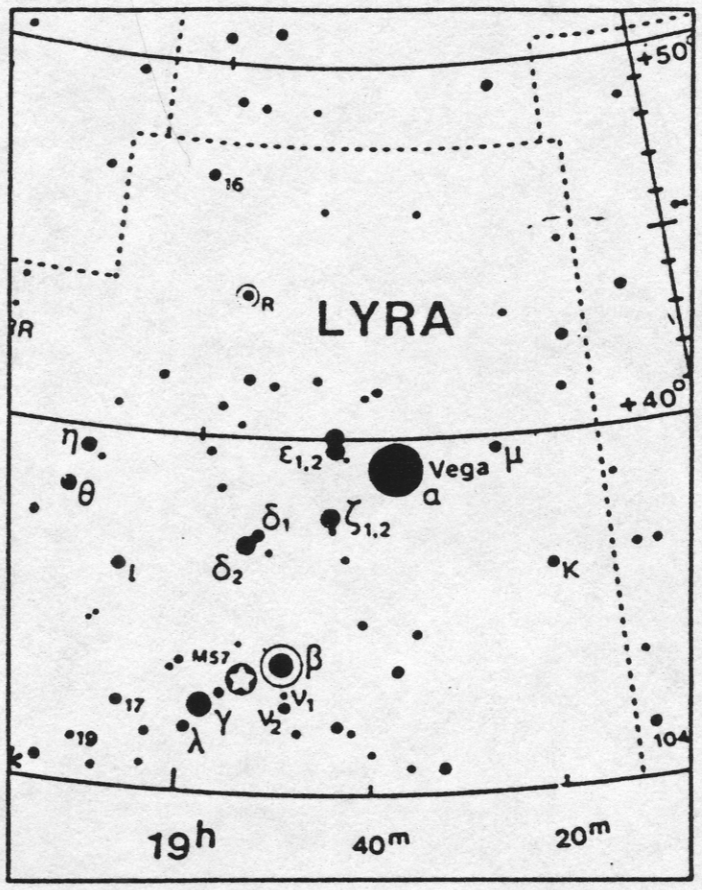
4.5 x 15 = 67.5'

OR 1° 7½'

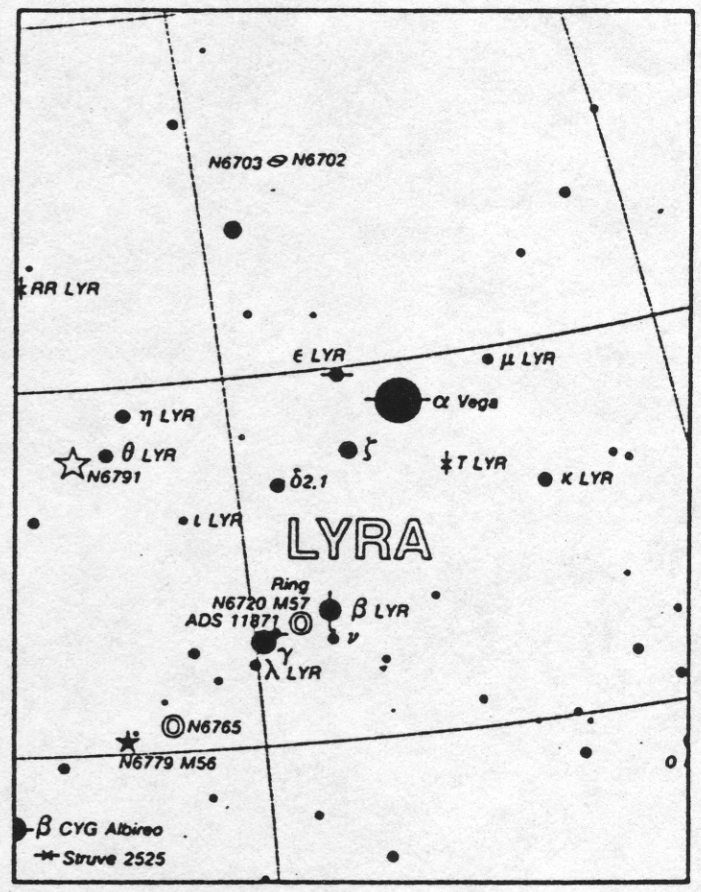
COMPARISON OF STAR ATLASES



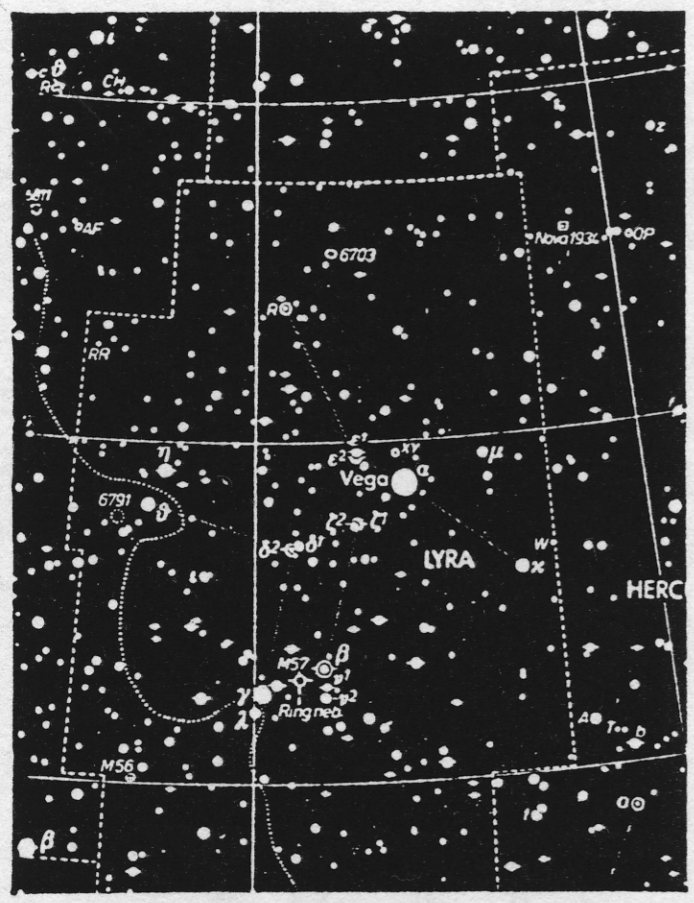
Norton's Star Atlas.



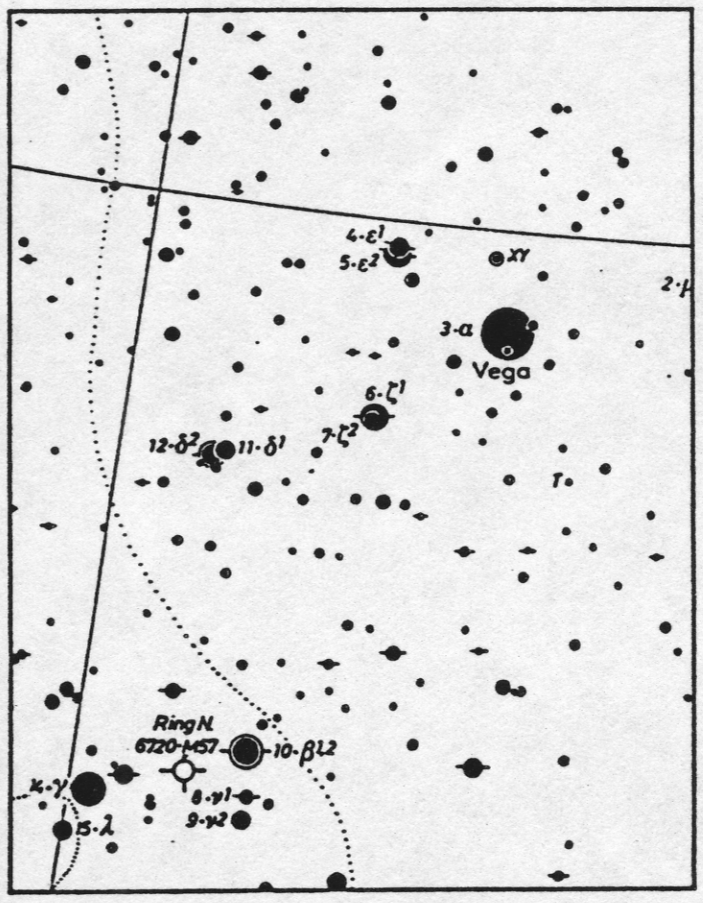
Edmund *Mag. 6 Atlas.*



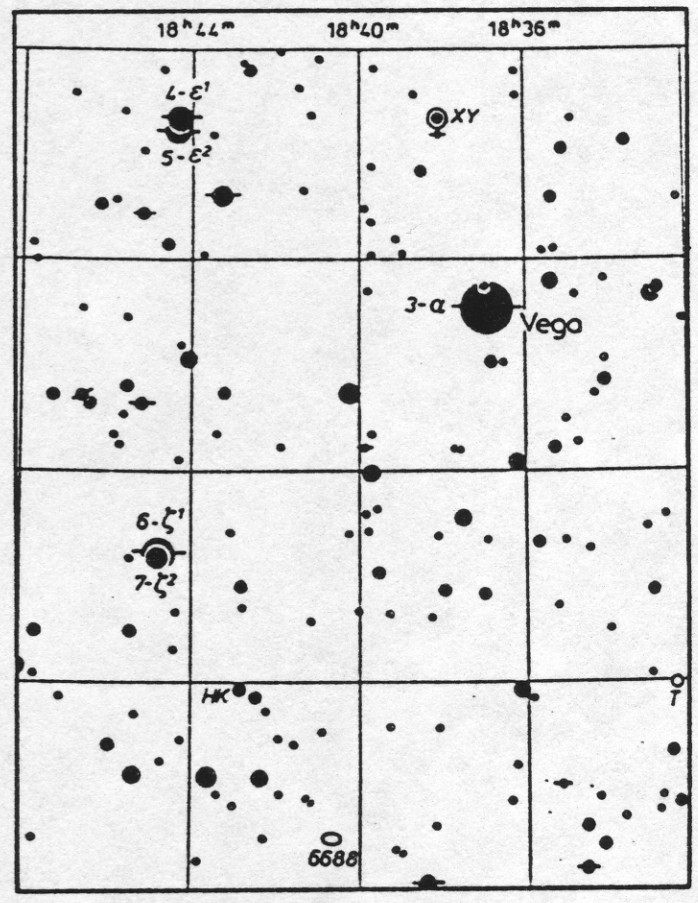
1000+.



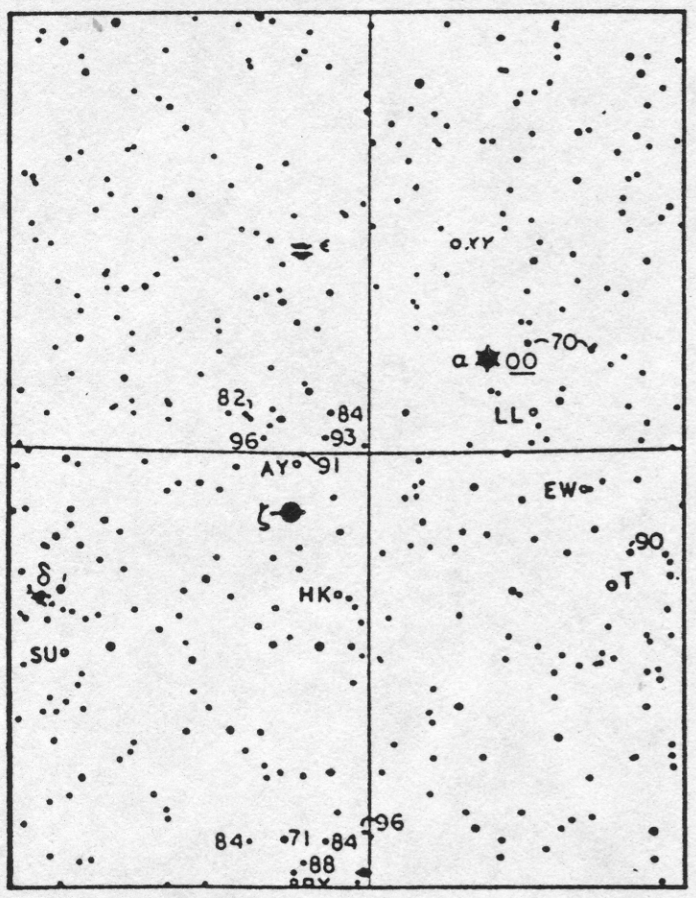
A Field Guide to the Stars and Planets.



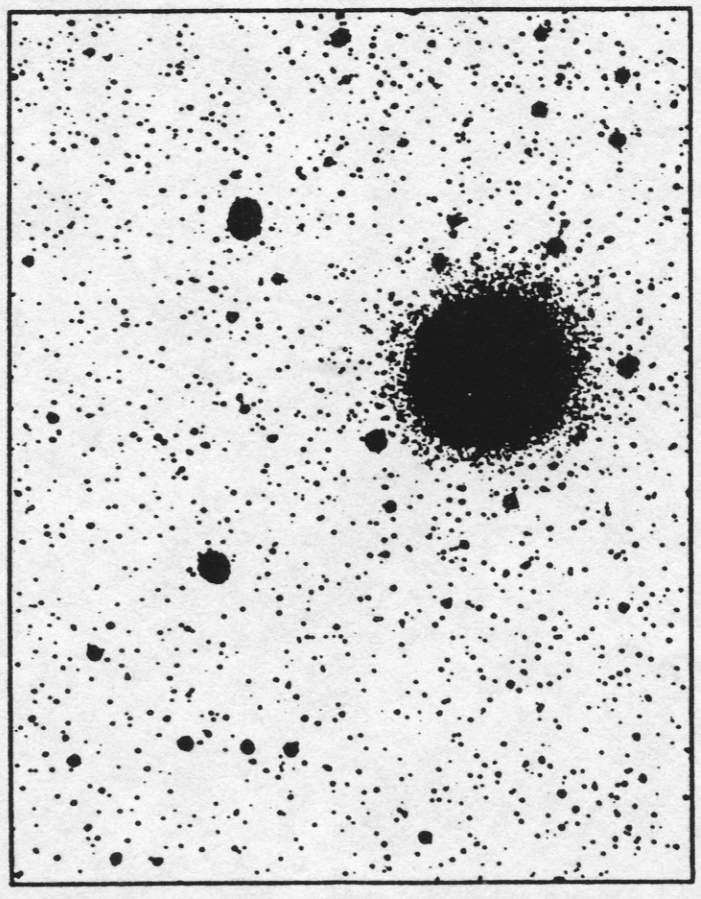
Sky Atlas 2000.0.



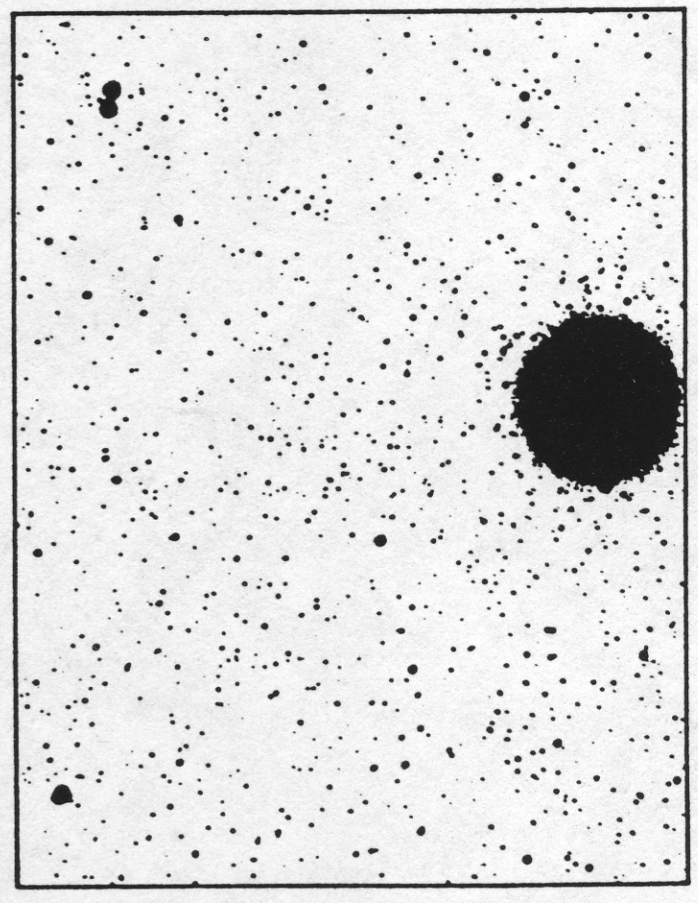
Uranometria 2000.0.



The AAVSO Variable Star Atlas.



Photographic Star Atlas.



Atlas Stellarum.