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A SPECIAL PUBLICATION OF The American Association of Amateur Astronomers

Observing Autumn Deep Sky Objects

The purpose of this program is to provide a starting point for new astronomers to begin their exploration of the sky. With the help of the star charts on the back, and the slide show this evening, you should be able to find each of the objects mentioned on this page. The constellations and objects were chosen from some of the most beautiful astronomical objects that can be observed during the autumn months, and are representative of each of the major five categories of deep sky objects: a galaxy, a globular cluster, an open cluster, a planetary nebula, and an emission nebula. As you find each object, use the observing form that has been provided to record your observations. To begin, find the constellation with the naked eye, then look for the object with binoculars. Finally, use a telescope to view the object up close. Enlist the help of your friends as necessary.

Triangulum

A great galaxy in the autumn sky is the **face on spiral galaxy M33 in Triangulum**. M33 is a large, diffuse galaxy, but it is very dim due to its face-on orientation, and requires a good, steady night for best views. Nevertheless, it can easily be found with binoculars as a bright fuzzy patch below M31. M31, M33 and our own galaxy, the Milky Way, are part of a cluster of galaxies called the Local Group of Galaxies.

To Find M33: First find M31, the Great Galaxy in Andromeda. Start from 3rd base of the Great Square of Pegasus. Then, simply count stars, 1, 2 to Beta Andromeda (away from the great square), then up (west) 1, 2 stars, and there it is!

Once you have found M-31, M-33 is on the exact opposite side of Beta And, and an equal amount below the star. M33 is not a naked eye object except in perfectly dark conditions.

Pegasus

The constellations Andromeda and Perseus, along with Pegasus, Cassiopeia and Cepheus, are richly intertwined in mythology, but are vastly divergent in the objects they present to amateur astronomers.

The constellations of Pegasus and Andromeda contain many galaxies, most of which are relatively faint. They challenge the observer not only to find them, but to detect the detail that can be found in them.

While Perseus lies along the Milky Way, and offers many sparkling open clusters and diffuse nebulae, Andromeda lies away from our galaxy's plane, and lets us see the inhabitants of intergalactic space. Some of the finest objects of their respective classes reside in these constellations, and it is well worth braving cold weather to observe them.

One object of special note in Pegasus, however, is not a galaxy. It is the **globular cluster, M15**.

M-15 is a nice, bright globular cluster

that is easily seen in the viewfinder or binoculars. It handles magnification well, showing a tight mass of stars 8' in diameter with a much brighter central region. Individual stars are resolved around the edges and across its face but not quite to the center.

This cluster can be found by starting at Alpha Pegasi, the opposite corner of the Great Square of Pegasus from Andromeda, and then following the chain of stars depicting the head of the Flying Horse. M15 will be right at the end of the this chain of stars, situated like a small fly buzzing around the nose of the flying horse.

Perseus

A different type of cluster, in fact, two clusters, are the open clusters **NGC 869 & 884 in Perseus**. The **Double Cluster in Perseus** is one of the finest sights in the sky. These two open clusters are both large and bright, and fall in the same low power field of view. NGC 869 is the brighter and more concentrated of the two, and is dominated by two bright orange stars near its center. NGC 884 is slightly larger, and has many more orange-red stars. Both clusters contain over 100 stars each.

Aquarius

The four constellations of Aquila, Aquarius, Capricornus, and Delphinus lie relatively close to each other along the southern horizon in a region of the sky which is almost devoid of bright showpiece deep sky objects. Aquarius and Capricornus lie away from the main body of the Milky Way, and mostly contain faint galaxies with only a few star clusters and nebulae. Aquila and Delphinus, on the other hand, lie right along the Milky Way and contain some fine examples of planetary and dark nebulae. Even though there are only four Messier objects in this entire region, there are still enough deep sky targets to keep an astronomer busy on an autumn evening.

NGC 7293, The Helix Nebula in

Aquarius, while not a Messier object, is of special note. Lying at a distance of only about 325 light years, this planetary nebula is probably the closest planetary nebula to us in space. Its light is spread out over about 15', so its surface brightness is rather low. Easily seen in binoculars as a greyish circle of light, this object absolutely jumps out of the eyepiece of your telescope when observed with an O-III filter.

Orion

Orion is one of the most easily recognized of all the constellations. Led by the bright stars Betelgeuse and Rigel, this constellation holds many fine telescopic and binocular objects, along with some of the most photographed regions of the sky. Its arrival in the night sky in December signals the beginning of the winter observing season, with its crisp, clear nights and fine "seeing".

M42, the Great Nebula in Orion, is one of the finest sights in the entire sky. M42 is easily visible to the naked eye as the "fuzzy" star in the middle of Orion's sword. It appears distinctly nebulous in binoculars or finderscopes, and shows an amazing amount of detail through the telescope. It is fully one degree in extent, with a wealth of fine curling wisps of nebulosity curving out from the brightest region surrounding the four relatively bright stars known as the Trapezium. On good nights with low power, it is possible to see colors in this object. The region around the Trapezium appears as a cold steel blue color, while the wispy regions further away can appear as a soft ruddy pink. Slightly separated from the main nebulosity is M-43. This nebula is seen as a comma shaped cloud surrounding an eighth magnitude star just north of the Great Nebula. The more time you spend in this area, the more fine detail you can see.

(Excerpts from *Constellation of the Month* articles by Rick Raasch.)

- ZERO
- FIRST
- SECOND
- THIRD
- FOURTH
- FIFTH

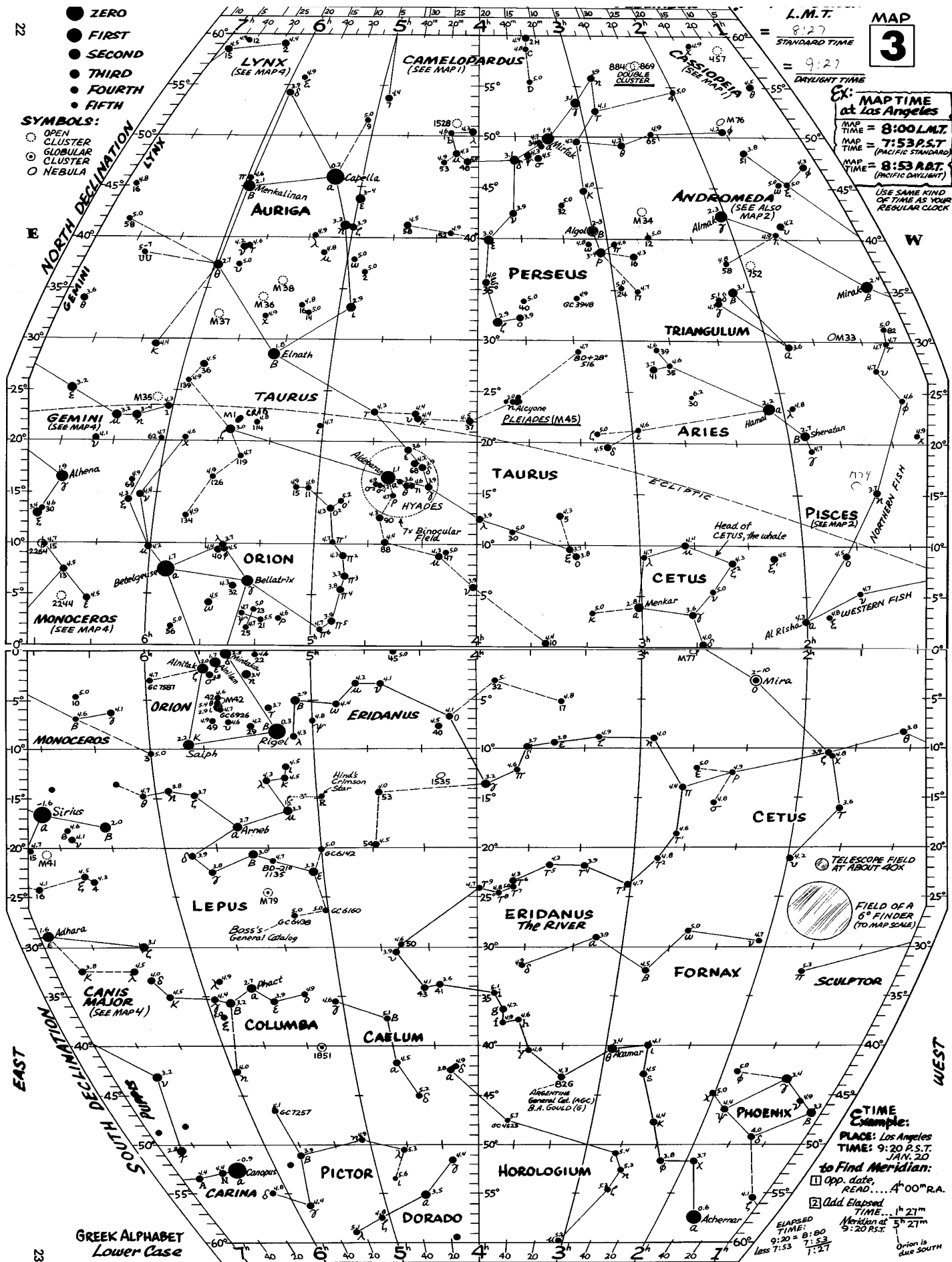
- SYMBOLS:**
- OPEN CLUSTER
 - ⊙ GLOBULAR CLUSTER
 - NEBULA

L.M.T. = 8:27
 STANDARD TIME
 = 9:27
 DAYLIGHT TIME

MAP 3

EX: MAP TIME at Los Angeles
 MAP TIME = 8:00 L.M.T.
 MAP TIME = 7:53 P.S.T. (PACIFIC STANDARD)
 MAP TIME = 8:53 A.D.T. (PACIFIC DAYLIGHT)

USE SAME KIND OF TIME AS YOUR REGULAR CLOCK



GREEK ALPHABET Lower Case

α β γ δ ε ζ η θ ι κ λ μ ν ξ ο π ρ σ τ υ φ χ ψ ω
 Alpha Beta Gamma Delta Epsilon Zeta Eta Theta Iota Kappa Lambda Mu Nu Xi Omicron Pi Rho Sigma Tau Upsilon Phi Chi Psi Omega

TIME Example:
 PLACE: Los Angeles
 TIME: 9:20 P.S.T. JAN. 20
to Find Meridian:
 1 Opp. date, READ... 4^h 00^m R.A.
 2 Add Elapsed TIME... 1^h 27^m
 Meridian at 5^h 27^m
 9:20 = 8:00
 9:20 P.S.T. = 8:00 L.M.T.
 less 7:53 = 0:27
 Orion is due SOUTH

Rule: YOUR ZENITH PARALLEL OF DECLINATION IS THE SAME AS YOUR LATITUDE

Example:

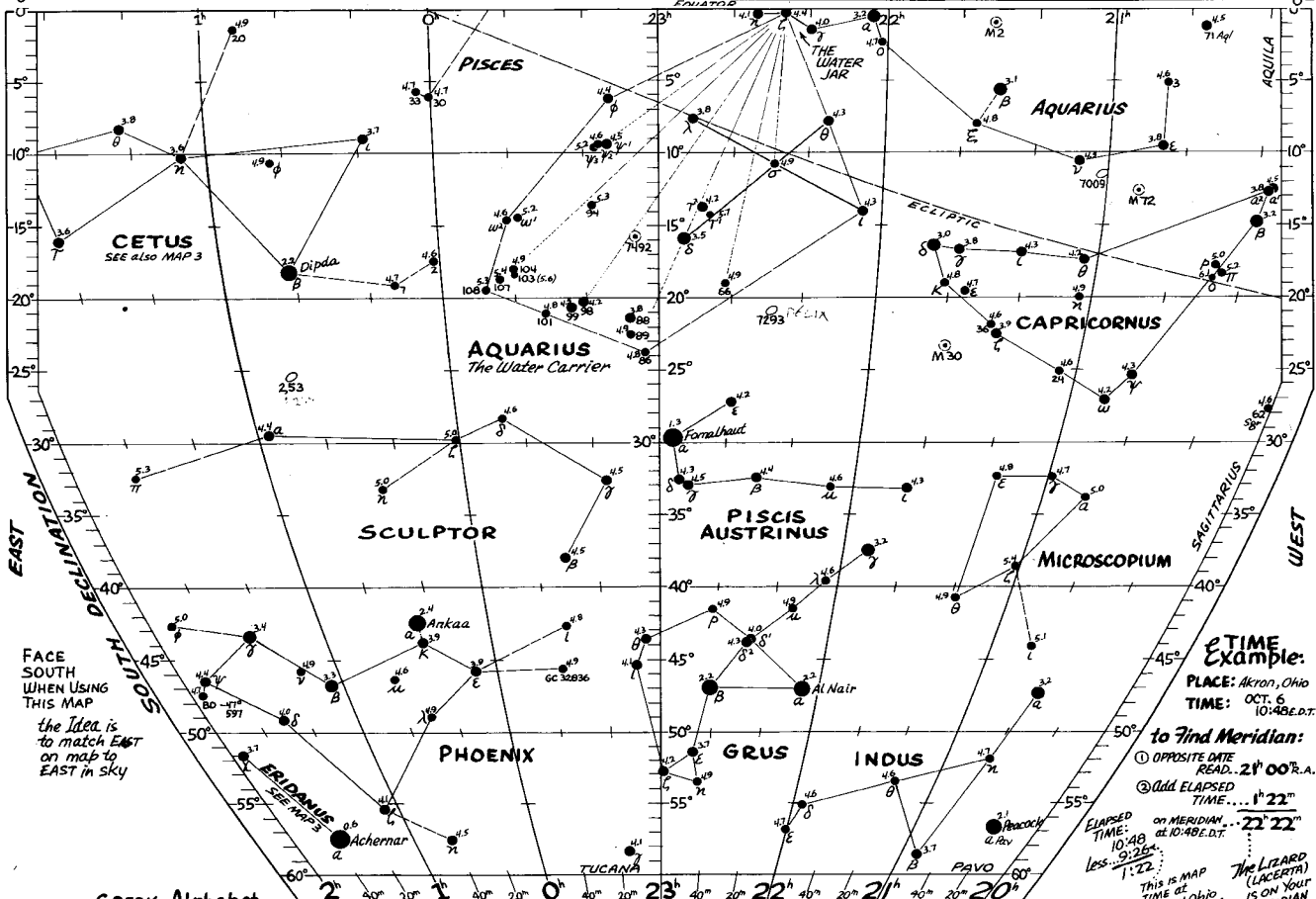
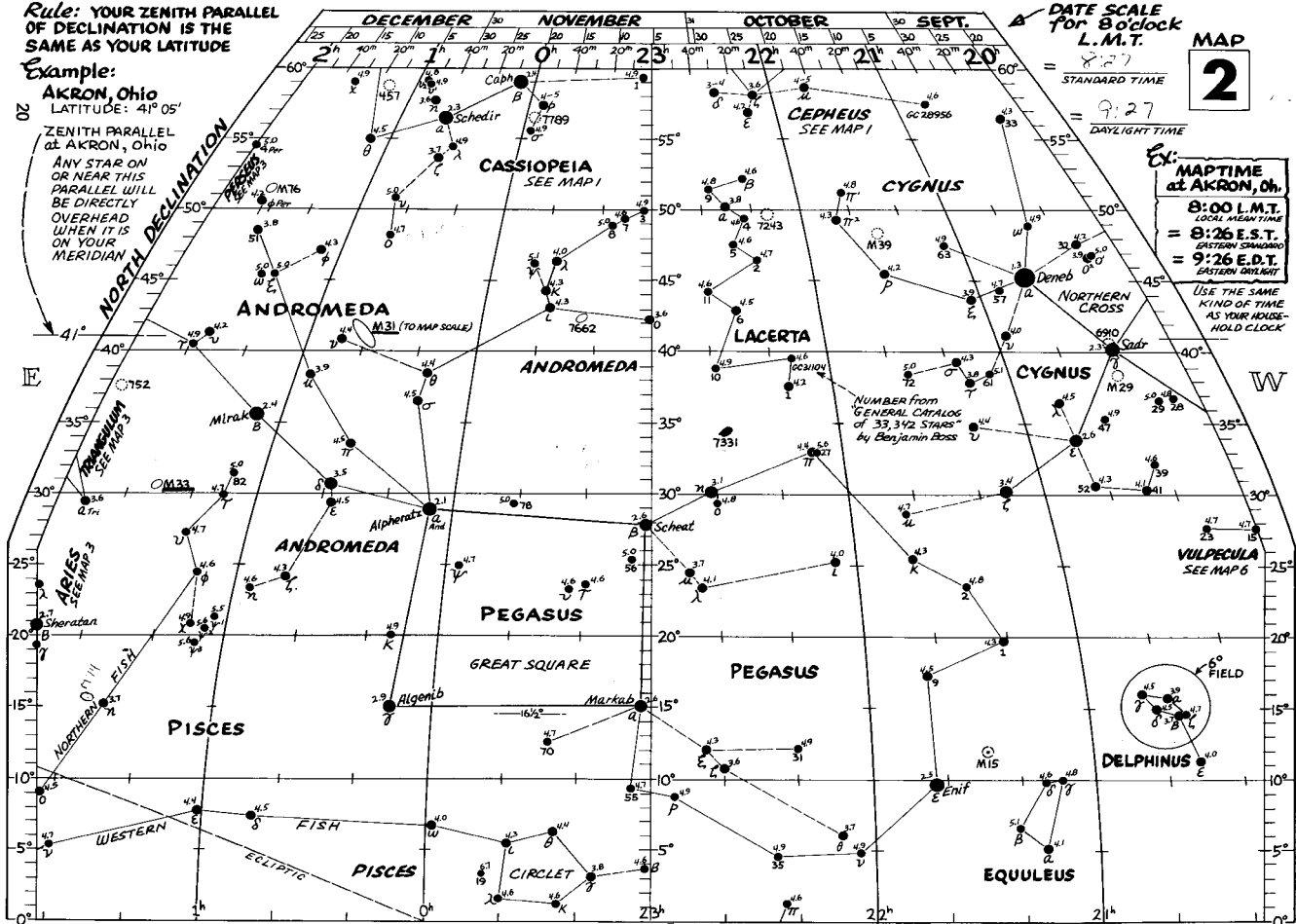
AKRON, Ohio
 LATITUDE: 41° 05'
 ZENITH PARALLEL AT AKRON, OHIO
 ANY STAR ON OR NEAR THIS PARALLEL WILL BE DIRECTLY OVERHEAD WHEN IT IS ON YOUR MERIDIAN

DATE SCALE for Bodock L.M.T.

MAP 2

STANDARD TIME = 8:27
 DAYLIGHT TIME = 9:27

Ex: MAPTIME at AKRON, Oh.
 8:00 L.M.T. LOCAL MEAN TIME
 = 8:26 E.S.T. EASTERN STANDARD
 = 9:26 E.D.T. EASTERN DAYLIGHT
 USE THE SAME KIND OF TIME AS YOUR HOUSE—HOLD CLOCK



GREEK Alphabet

α β γ δ ε ζ η θ ι κ λ μ ν ξ ο π ρ σ τ υ φ χ ψ ω
 Alpha Beta Gamma Delta Epsilon Zeta Eta Theta Iota Kappa Lambda Mu Nu Xi Omicron Pi Rho Sigma Tau Upsilon Phi Chi Psi Omega

ETIME Example:
 PLACE: Akron, Ohio
 TIME: OCT. 6 10:48 E.D.T.
 to Find Meridian:
 ① OPPOSITE DATE READ... 21^h 00^m R.A.
 ② Add ELAPSED TIME... 1^h 22^m
 on MERIDIAN at 10:48 E.D.T. ... 22^h 22^m
 ELAPSED TIME: 10:48
 less: 9:26
 1:22
 This is MAP TIME at AKRON Ohio Daylight time
 THE LIZARD (LACERTA) IS ON YOUR MERIDIAN



Observing Log

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Observer: _____ Location: _____ Page: _____

INDEX	Period - Instrument		Notes
Object	Date	Time	
	Power	Seeing	
	Type Instrument		
Object	Date	Time	
	Power	Seeing	
	Type Instrument		
Object	Date	Time	
	Power	Seeing	
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Object	Date	Time	
	Power	Seeing	
	Type Instrument		