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the ASTROGRAPH



VOLUME 6 NO. 2 OCTOBER NOVEMBER 1974

the ASTROGRAPH

The magazine devoted to Astrophotography

VOLUME VI No. 2

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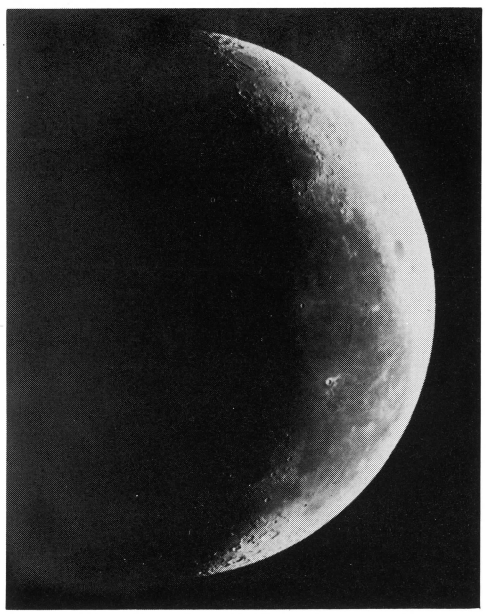
Perseus 28



COVER PHOTOGRAPH

SAGITTARIUS

Photographer	M.R. O'Neal
Lens	55mm F.L.
F. No.	5.6
Exposure	10 minutes
Film	103aF
Developer	MWP-2
Developing Time	9 minutes

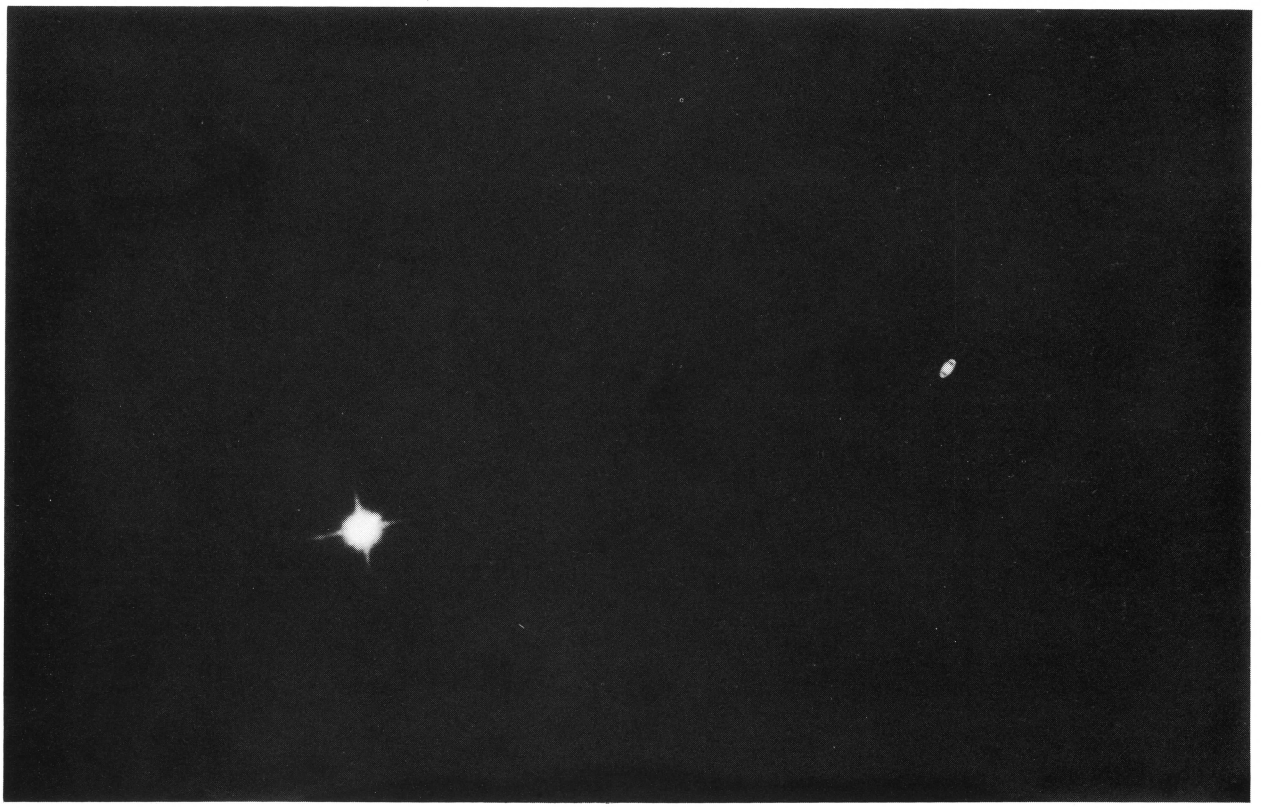


BACK COVER PHOTOGRAPH

LAST QUARTER/CRESENT MOON

Photographer	Jim Rouse
Telescope	7 inch F/15 refractor
F No.	Prime focus F/15
Exposure	$\frac{1}{4}$ second
Film	Kodachrome II
Copied Onto	H.C. Copy
Paper grade	#1
Date	1970

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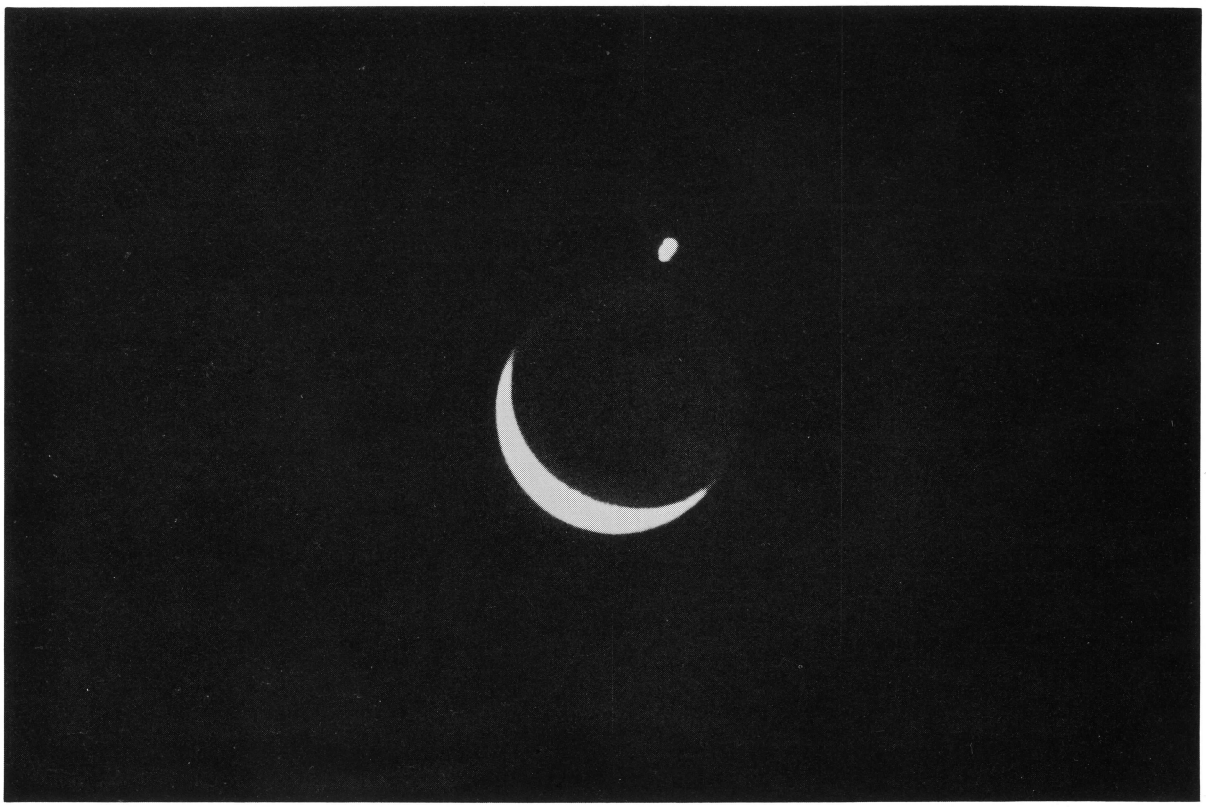


ABOVE: Venus and Saturn photographed by M.R. O'Neal on July 31, 1974 at 5:20 AM PDT using a 6 inch reflector and positive projection. Exposure was 4 seconds on Tri-X developed in D-76 for 8 minutes. Enlargement is 5X.

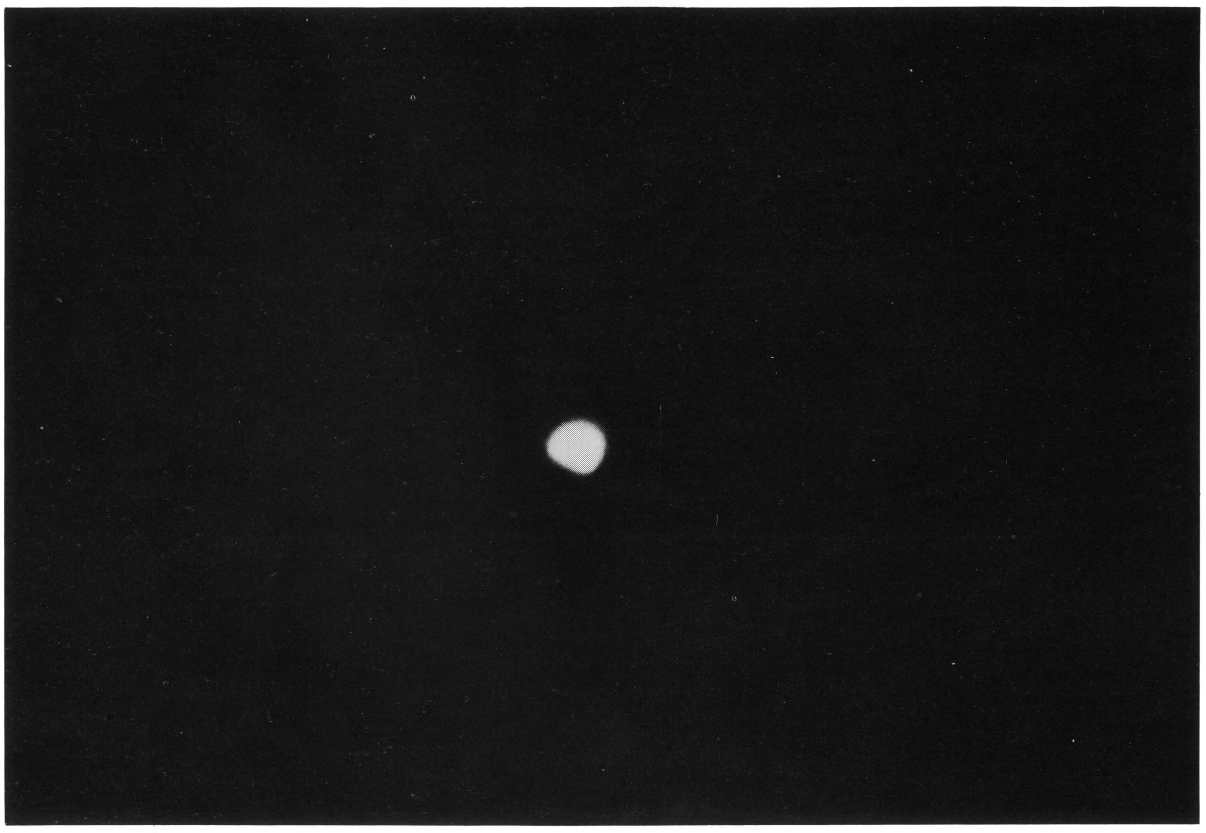


ABOVE: M8 photographed by M.R. O'Neal in April 1974 using a 6 inch F/8 reflector. Exposure was 20 minutes on 103aF developed in MWP-2. Enlargement is 5X

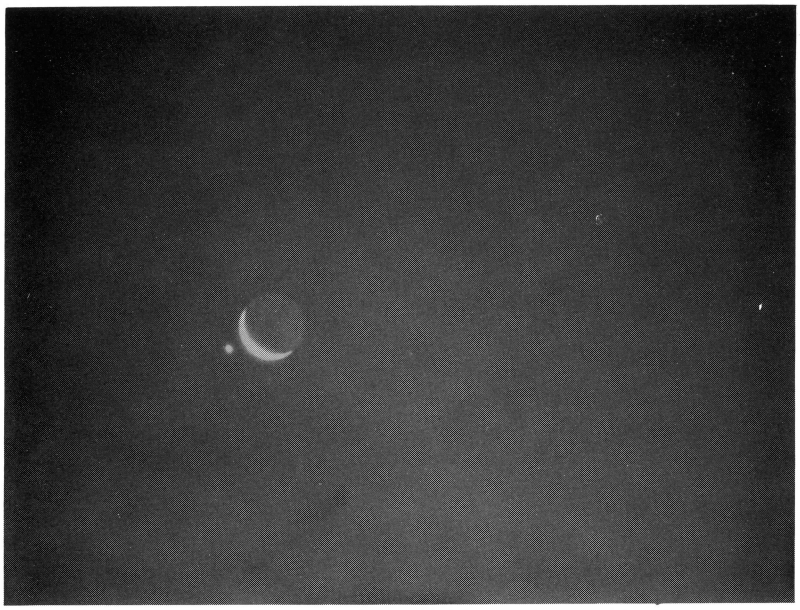
OCCULTATION OF VENUS



ABOVE: Venus Occultation before the end of emersion photographed by Ronald G. Lee using the 36 inch F/10 Fernbank Science Center reflector. Exposure was 1/30 second on Tri-X film developed in D-76.



ABOVE: Venus Occultation photographed by Ronald G. Lee at 5:47 AM EDT using a 300mm F/5.6 Nikkor lens. Exposure was 5 seconds on Tri-X film developed in D-76.



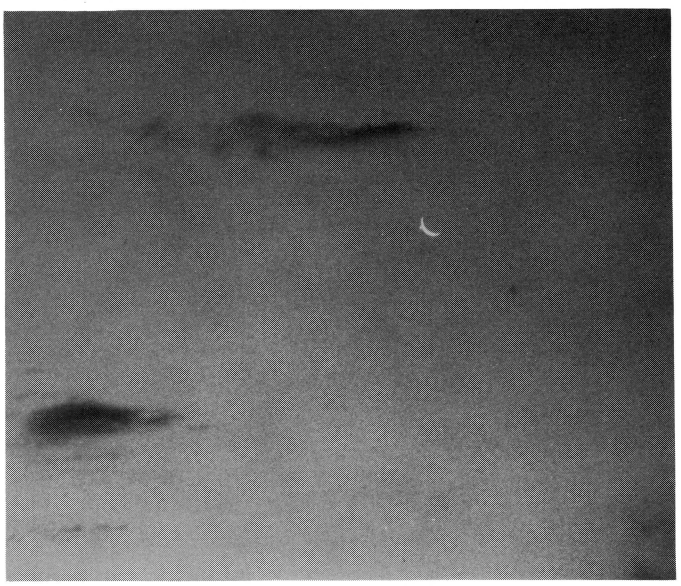


LEFT: Occultation of Venus on July 17, 1974 photographed by Steve Bennett and Dick Kerian (both age 17). Exposures were 1 second with a 230mm lens at F/2.8 on Tri-X film.

BOTTOM LEFT: Occultation of Venus by Steve Bennett and Dick Kerian. Exposure was 2 seconds in Tri-X using a 130mm lens at F/2.8.

BOTTOM RIGHT: Same as bottom left except exposure was 1 second and lens was 90mm F/2.8.





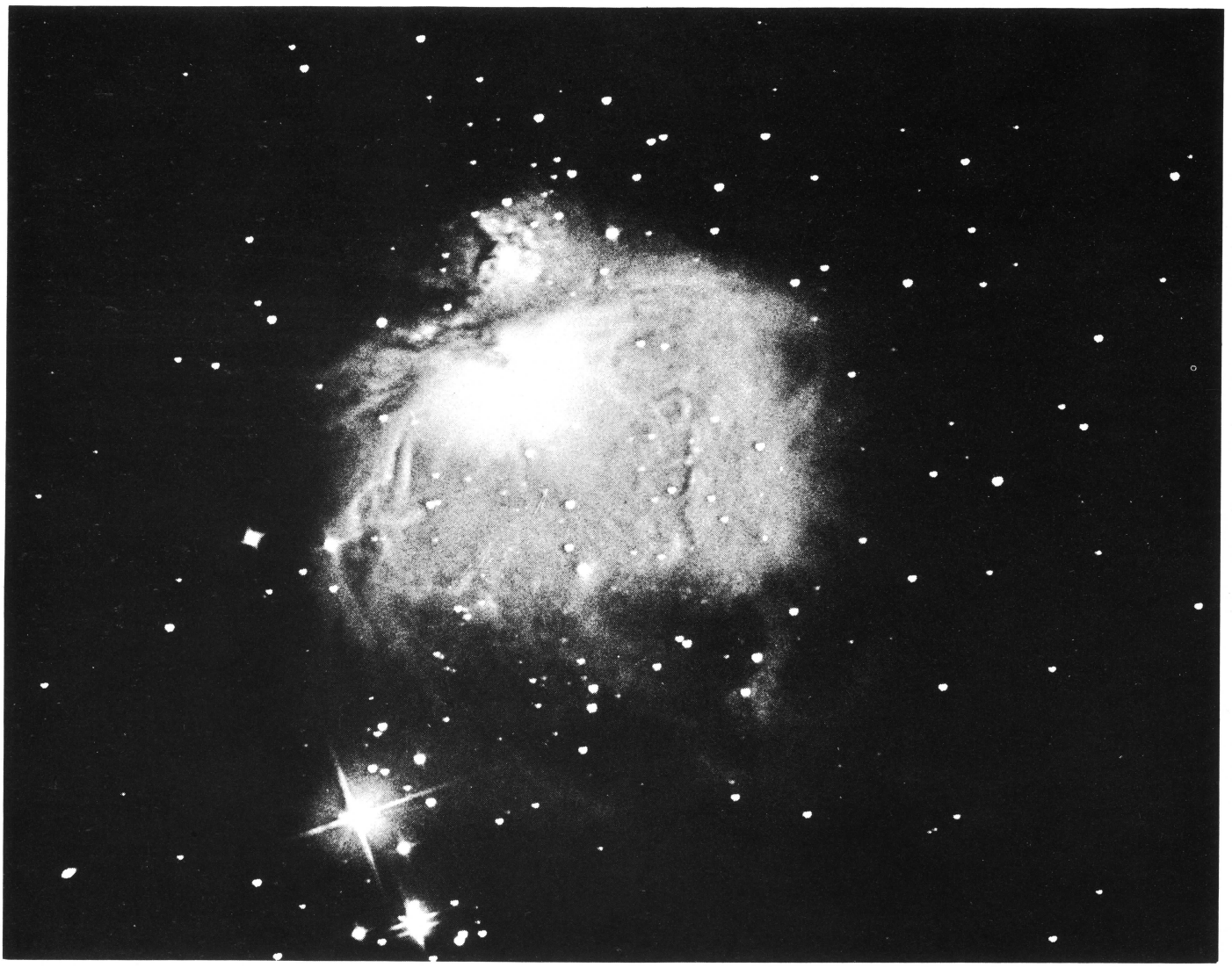
A MASKING TECHNIQUE

My photo of M-42 has been masked using the technique outlined by Mr. Brad Wallace in an astrophotography seminar which was presented at the Griffith Park Planetarium in the latter part of 1973.

I have varied my technique somewhat in that Kodak #5226 ortholine film, developed in Dektol diluted 4:1 (water to stockdeveloper) for his suggested Kodak #6125 copy film developed in D-11.

This masking technique is far superior to dodging with a hole cut in cardboard as any number of prints can be made and all will be exactly the same. The Kodak #5226 film is available in sizes from 4"x5" to rolls 30 " by 200 feet and may be obtained from any graphic arts supply or local lithographic printing plant. I recommend the latter as you should be able to purchase only a small number of sheets as opposed to the supply house which would only sell in minimum quantities of fifty sheets. The cost of this material is only a little more than the cost of good quality enlarging paper of the same size. Also, any other brand of ortholine film as manufactured by "3M", "Fuji" films, Dupont, etc., should be suitable substitute for the Kodak film.

My mask was made as follows: The enlarger was set to the desired enlargement and then the film was placed in the board, emulsion up. Over the film was placed a 1/16" thick piece of glass on top of which was placed a sheet of vellum tracing paper. Exposures were tried until the mask was dense enough so that no exposure would be made in the background when the mask was in place over the print paper. After the film was dried, it was then placed on the enlarger board in register with the projected image of the original negative and taped down along one edge. The film was rolled back out of the way and a test strip was made to determine an exposure for the background sky areas. A



ABOVE: M42 photographed by M. R. O'Neal in January 1974 at Triunfo Pass, Malibu, California, using a 6 inch F/8 reflector. Exposure was 10 minutes on 103aF developed in MWP-2 for 9 minutes. Enlargement is 8X. Masking technique is described in the article on page 22.

new piece of paper was exposed for this amount and then the mask was laid over the paper. A new set of test exposures were made for the center areas of the nebula and this exposure was determined to be five times the background exposure. Mention should be made that developing times should be the same for both exposures. An added advantage of masking is that it also reduces the helos around very bright stars.

I am teaching this technique to other amateurs in this area and we are planning to use this method extensively in the future.

Michael R. O'Neal
817-15th Street "C"
Santa Monica, California 90403

ASTROPHOTOGRAPHY FOR OCTOBER AND NOVEMBER

MERCURY reaches a greatest Eastern elongation of 26° on October 1 and a greatest Western elongation of 19° on November 10. Both elongations will be unfavorable from a photographic standpoint. Apparent declination of Mercury on October 1 will be -15° and on November 10 -9°.

VENUS is moving to superior conjunction which it will reach on November 7.

The Moon will reach its highest declination on October 6th (21hr), November 3rd (02hr) and November 30 (10hr). It reaches perigee on October 12th (16hr), November 8th (04hr), and December 3rd (07hr). The last quarter Moon is in excellent photographic position in October and worsens during November and December while the last gibbous phase is in excellent photographic position in October, November, and December.

MARS moves from VIRGO into LIBRA during the second week of November. Mars reaches conjunction with the Sun on October 14th (13hr).

JUPITER is in AQUARIUS at declination of -10° to -9° during October and November. Jupiter's diameter decreases from 46 arc seconds on October 1 to 42 arc seconds on November 1 and 38 arc seconds on December 1. Although Jupiter is in better photographic position than in previous years, it is not very high on the ecliptic and as a result suffers from the degrading effects of atmospheric turbulence far more than does the last quarter and gibbous phases of the Moon.

SATURN is very favorably placed for photography in GEMINI at declination +22°. Saturn crosses the meridian in the early morning hours before twilight.

URANUS reaches conjunction with the Sun on October 21 (22hr.).

NEPTUNE reaches conjunction with the Sun on December 1 (22hr.).

PLUTO reached conjunction with the Sun on September 30th(06hr.).

PHASE	DATE	DECL.	DIAMETER
Full	Oct. 1 (11hr.)	+7°	30'10"
Last Quarter	Oct. 8 (20hr.)	+20°	32'10"
New	Oct.15 (12hr.)	-12°	32'16"
First Quarter	Oct.23 (02hr.)	-17°	29'39"
Full	Oct.31 (01hr.)	+17°	30'57"
Last Quarter	Nov. 7(03hr.)	+12°	32'16"
New	Nov.14(01hr.)	-20°	31'21"
First Quarter	Nov.21(23hr.)	-7°	29'33"
Full	Nov.29(15hr.)	+22°	31'52"
Last Quarter	Dec. 6(10hr.)	+1°	32'11"

MINOR PLANETS

PLANET	MAGNITUDE	POSITION NOV. 1		POSITION DEC. 1	
CERES	7.4-8.0	22^h32^m	-23°06'	22^h45^m	-19°49'
PAIIAS	9.6-10.1	19^h38^m	+1°44'	20^h07^m	-0°57'
JUNO	8.1-8.6	22^h32^m	-12°19'	22^h57^m	-11°59'
VESTA	7.4-7.6	16^h17^m	-19°06'	17^h24^m	-21°51'

EVENTS

A total eclipse of the Moon will occur on November 29 (12hr. to 18hr.). The beginning of the umbral phase will be visible from the northwestern half of North America and New Zealand with the end visible from only the extreme northwestern part of North America. The entire eclipse will be visible from the Pacific Ocean, Australia and Northeastern Europe.

Mercury will be occulted by the Moon on October 16th (19hr.) for areas of the North Pacific, Southwest of North America, Central America and North of South America

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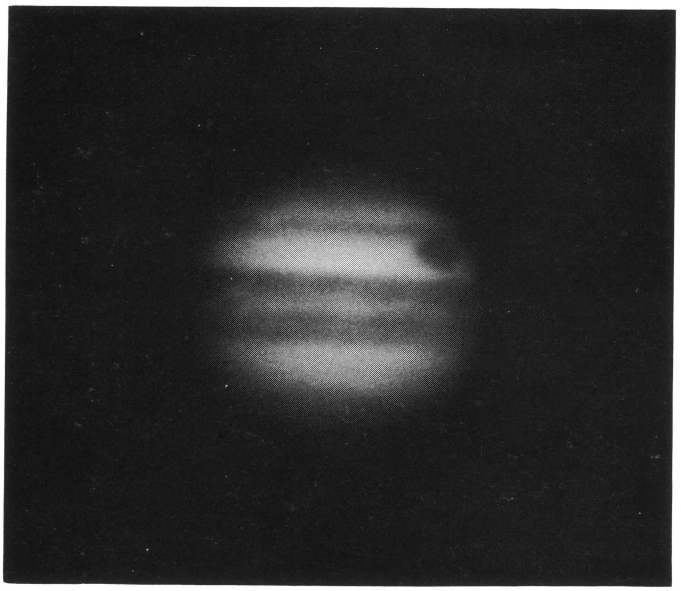
This film is now available in 100-foot rolls. Use it for both deep-sky and lunar-planetary photography. The editor of *THE ASTROGRAPH* uses it exclusively for lunar photography and on numerous occasions for deep-sky work. For Martian observations with IV-E film, see page 20 of the April-June issue of *CELESTIAL OBSERVER*; for lunar photography see pages 124-125 of the February, 1972, issue of *SKY AND TELESCOPE*. Cost of $28.50 per 100-foot roll includes continental air shipment. Send check to:

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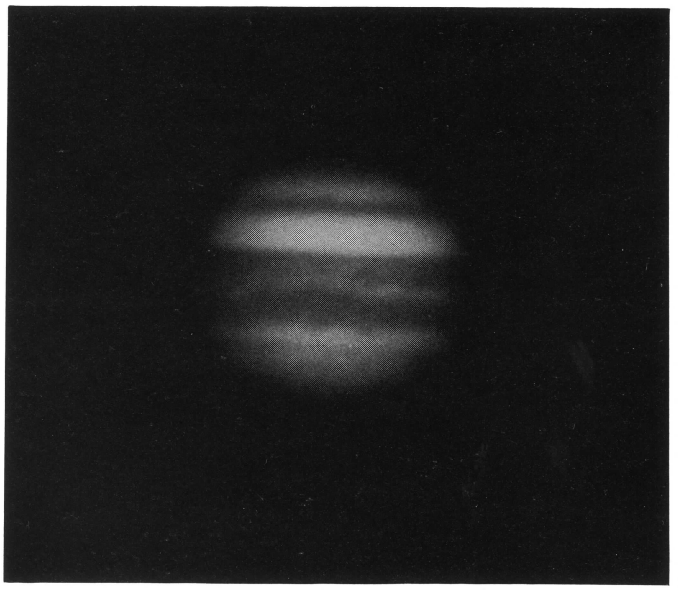
RECENT JOVIAN PHOTOGRAPHS



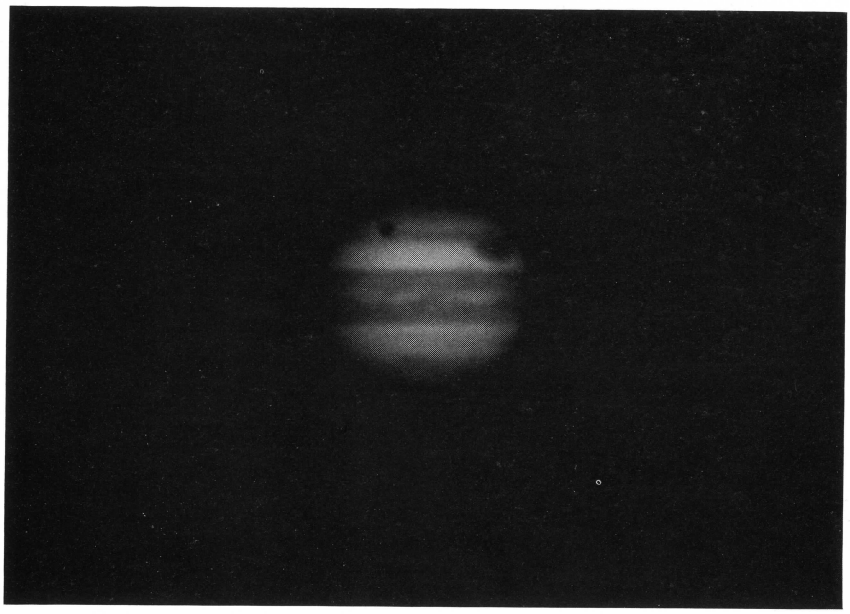
ABOVE: Jupiter and Ganymede Transit photographed by Jim Rouse on August 19,1974 (0040 EDT) using an 8 inch F/7 reflector working at F/105. Exposure was 5 seconds on S.O. 410 film developed in HC-110 Dilution "D" for 6' at 80°F. Enlarged 15X on #1 paper. Seeing was 8/10

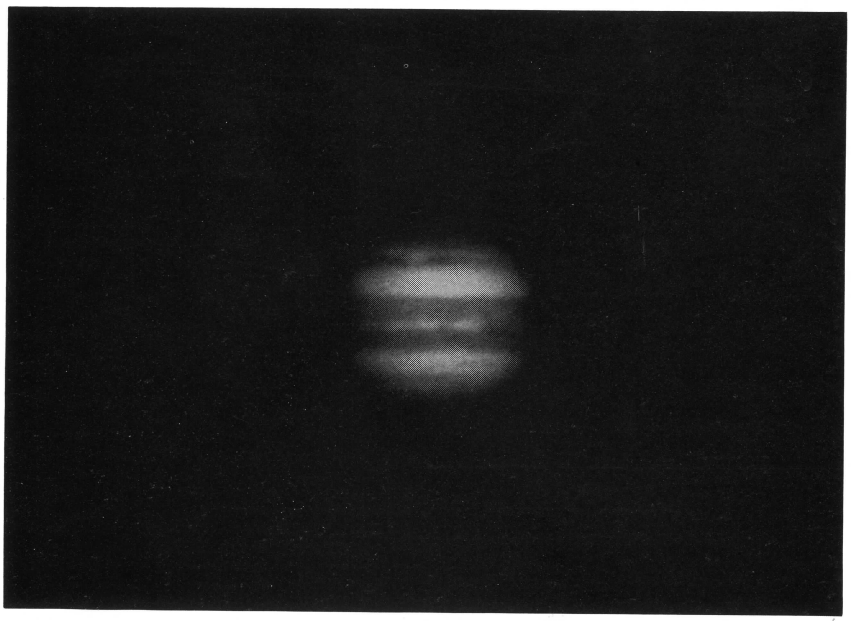


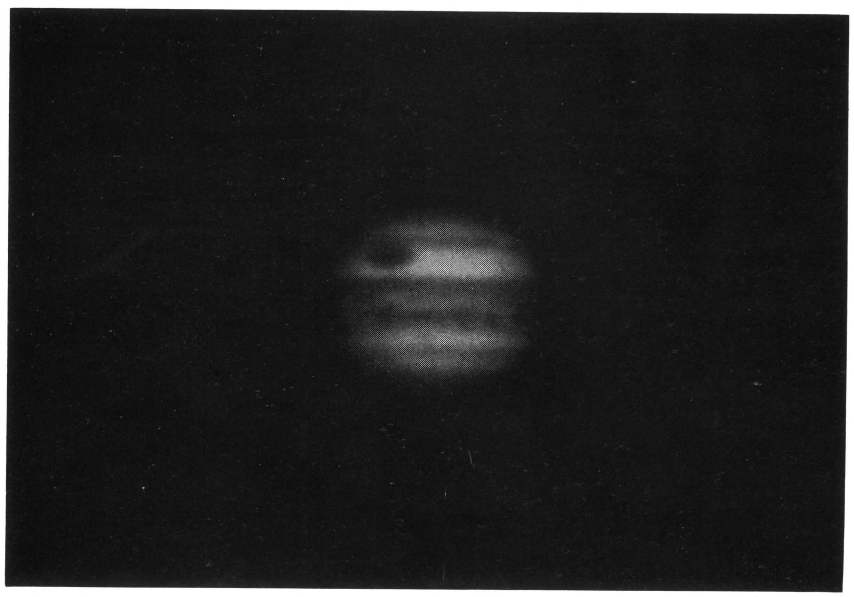
ABOVE: Jupiter photographed by Jim Rouse on August 9, 1974, (0050 EDT). Exposure was 5 seconds at F/80 on H.C. Copy developed in H&W Control Developer (15 ml. in 8½oz.) 10 minutes at 80°F. Enlargement was 15X on #3 paper. Seeing was 8/10.



ABOVE: Jupiter photographed by Jim Rouse on August 8, 1974 (0110 EDT). Data same as photo on left.



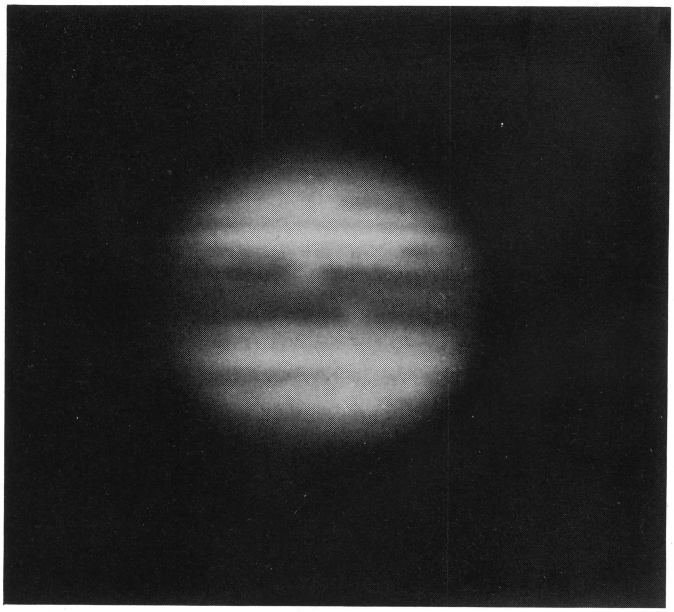




LEFT: Three Jupiter photographs by John Sanford. All photographs using a 12 inch F/10 R.C. and 32mm projection ocular. Upper photograph was a 2 second exposure on SO410 developed in Ethol Blue. Taken on July 24, 1974 (1135 UT). Middle photo was a 1 second exposure on SO410 developed in Ethol Blue. Taken on August 5, 1974, (0940 UT). Lower photograph was a 1 second exposure on VTE developed in HC 110. Taken on August 16, 1974.



ABOVE: Jupiter and Ganymede Transit photographed by Jim Rouse on August 19, 1974, (0015 EDT). Exposure was 2 seconds at F/52 on H.C. Copy film developed in H&W Control Developer (15ml. in 8½ oz.) for 10 minutes at 80°F. Enlarged 15X on #1 paper. Seeing was 8/10.



ABOVE: Jupiter photographed by Kurt Rihm.

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RIGHT: Double Cluster photographed by John Soule using a $4\frac{1}{4}$ inch F/5 RFT. Exposure was 6 minutes on Tri-X (Diafine -2,400 ASA).

BOTTOM: M42 photographed by John Soule using a $4\frac{1}{4}$ inch F/5 RFT. Exposure was 6 minutes on Tri-X developed in Diafine.



PERSEUS

Perseus is a large Fall and Winter constellation, lying between Cassiopeia and Auriga. He was a hero in the Greek pantheon of mythology, and slew the Gorgon Medusa after which he met and married Andromeda. It lies in a fairly rich area of the northern Milky Way, and has many naked eye stars. Photographically, there are the remarkable open clusters NGC 869 and 884, known as the Double Cluster or Sword Handle of Perseus, the eclipsing variable star Algol, and the large diffuse nebulae near Xi, one of which is pictured here (the California Nebula). There are several other clusters, and many fainter double stars as well as a Messier object M76, to round out Perseus' attractions. Also keep in mind it is the radiant for the most reliable and usually the richest meteor shower of the year, in August.

The Double Cluster is of a size which can be tackled by any astrophotographer with virtually any equipment. The stars in the two clusters are bright enough so that with short focal lengths (50mm-200mm), a fine grain film can be used and the image enlarged considerably in the darkroom. If the ideal focal length were to be stated for these objects, probably 400 to 500mm would be chosen, to shown them well as clusters against the starry background. We are speaking of 35mm film size now. With a larger film size, of course, the focal length could be longer and still a wide enough field retained. I think amateurs generally neglect the use of even 2¼ (120) film size cameras even though they would deliver a superior image to 35mm for objects requiring short focal lengths. The Double Cluster is a fine object for color photography, since they contain numerous reddish and yellowish stars which contrast beautifully with the predominant white ones. Very long focal lengths are advised against unless one wants to isolate one or the other cluster. They are about 30' apart, so a focal length which would only show part of the moon (such as my 3,000 mm 12" Cassegrain) would not be suitable to show both clusters on 35mm film.

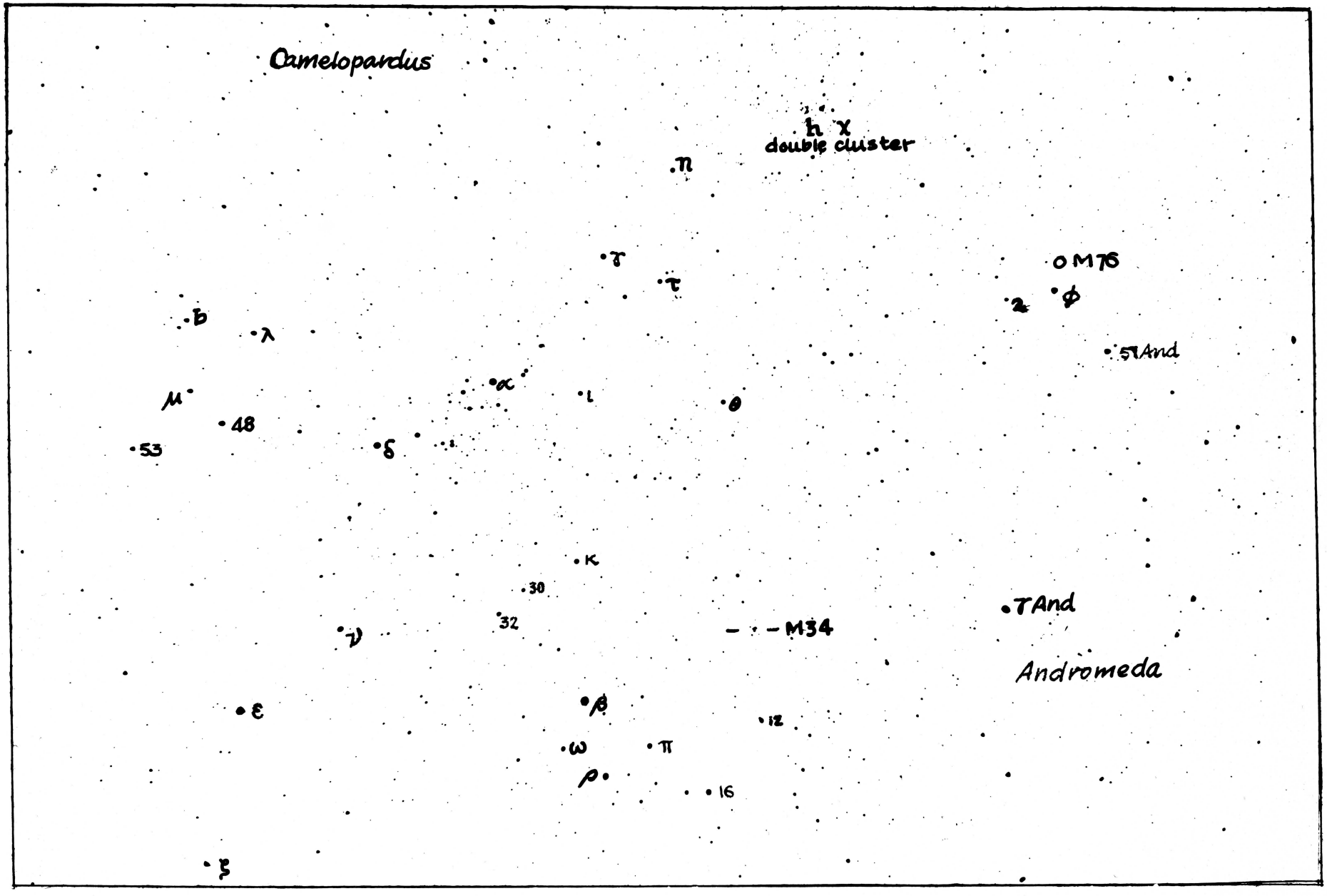
The California Nebula, known as NGC 1499, lies just north of Xi Persei, and is quite easily photographed. I first noted it on my 10 minute at F/4 55mm star atlas negative (103aF film), in the same picture with the Pleiades, and later took the Schmidt photo reproduced here. So it photographs very easily, but is difficult visually. I just detected the brightest wisps in a 6" F/4 RFT. In a color photo the nebula had a rich red color, so probably a red light exposure would show it with better contrast against the sky (with b&w film that is). It is about 2 degrees long, so even a 105mm lens will show some detail, while a 300mm would be about ideal. Fast F/ratios are in order, and a good dark sky will facilitate recording the California.

M 34 is a scattered open cluster, with about 70 stars which resembled to me a fainter edition of Praesepe in Cancer. There are several unequal double stars in the cluster, which seems to be characteristic of the constellation as a whole. M76 is a planetary nebula known as the faintest Messier object, and somewhat resembles the better known and brighter Dumbell Nebula in Vulpecula. There are two centers of luminosity connected by a fainter neck. Large aperture pictures show a fainter envelope around and to the sides of the Dumbell. This 12th magnitude object needs as much focal length as you have, since it is small (157"x87").

Algol is worth mentioning here as one variable star which is prominant to the naked eye. Its minima are quite sharply defined timewise, and it is therefore useful for developing a photographic method for magnitude measuring. There are basically two ways to do this, one requiring measurement of the star image size on the film and this is compared to a standard scale exposed for various times of a bright star (the fly spanker scale) or field such as the North Polar Sequence. Care must be taken in any of this work to keep the film emulsions and handling (processing and drying) the same for the calibration and actual plates. The other method would be to put the images of all the stars out of focus and then with a micro-densitometer read the densities of the out of focus blurs. These should be linear and relate to the magnitudes of the stars over quite a magnitude range. Here standardization of development, etc., is of the highest importance. More should be written about magnitude determination from amateur plates, especially the use of the iris photometer, a device not too difficult for the amateur to build.

No table of objects will be included this month, but I would like to give credit here to the books and charts which I used in observing, astrophotographing, and writing this column. The most valuable is E.J. Hartung's Astronomical Objects for Southern Telescopes (1968, Cambridge University Press), which describes over 1,000 objects, most of which I can see from 34° North. Hans Vehrenberg's beautiful Atlas of Deep Sky Splendors gives modern data for many objects and has photos of most of them, and two old books, Howe's A Study of the Sky, and the Rev. Webb's Celestial Objects for Common Telescopes round out my book references. The Skalnate Pleso Atlas and its catalog as well as good old Norton's Star Atlas (the new edition is worth getting!) are my charts. I have the SAO Atlas but don't use it too much.

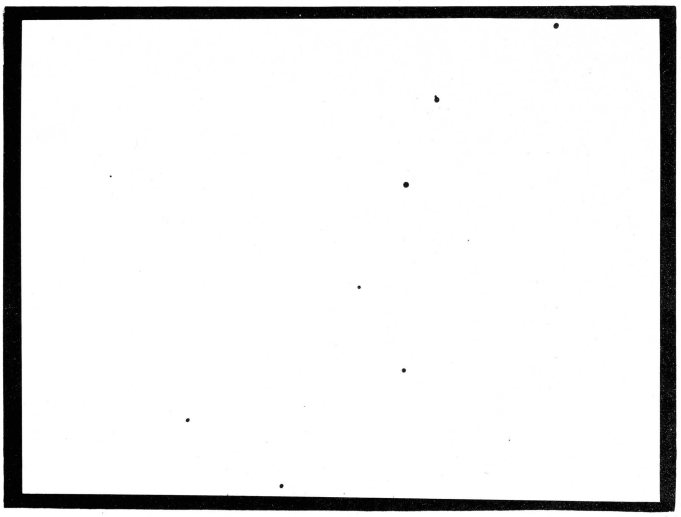
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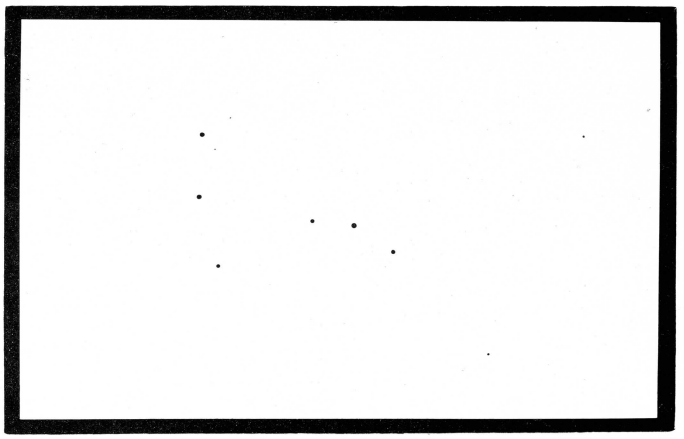
JOHN SANFORD



ABOVE: California Nebula (NGC1499) photographed by John Sanford on January 9, 1972, with a 225mm F.L. F/1.65 Schmidt camera. Exposure was 10 minutes on 103aF developed in D-19. Site was Orange County Astronomers area.



ABOVE: The Big Dipper photographed by Steve Bennett on July 11, 1974. Exposure was 20 seconds with a 55mm lens at F/1.4.



ABOVE: Scorpio photographed by Steve Bennett on July 11, 1974. Exposure was 20 seconds with a 55mm lens at F/1.4.

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FORMULATION: $X^E = \frac{1}{\text{Cosine Dec.}}$

HOW TO USE THE CHART

With a given focal length lens, if you can photograph a star of 0° dec. for 24 secs. before excessive trailing, chart indicates that for one at 60° dec. you can photograph twice as long, or 48 secs. before excessive trailing; at 70° dec. 2.9 x 24 secs. = 69.5 secs., etc. Basic nontrailing exposure limit varies inversely with focal length. If 24 secs. with 50mm F.L., then 12 secs. with 100mm F.L., etc.

For declinations greater than 81° calculate on individual basis. For example:

Polaris Dec. = $89^\circ 2'$

$$X^E = \frac{1}{\text{Cosine Dec.}}$$

$$X^E = \frac{1}{.01687}$$

$$X^E = 59.3$$

