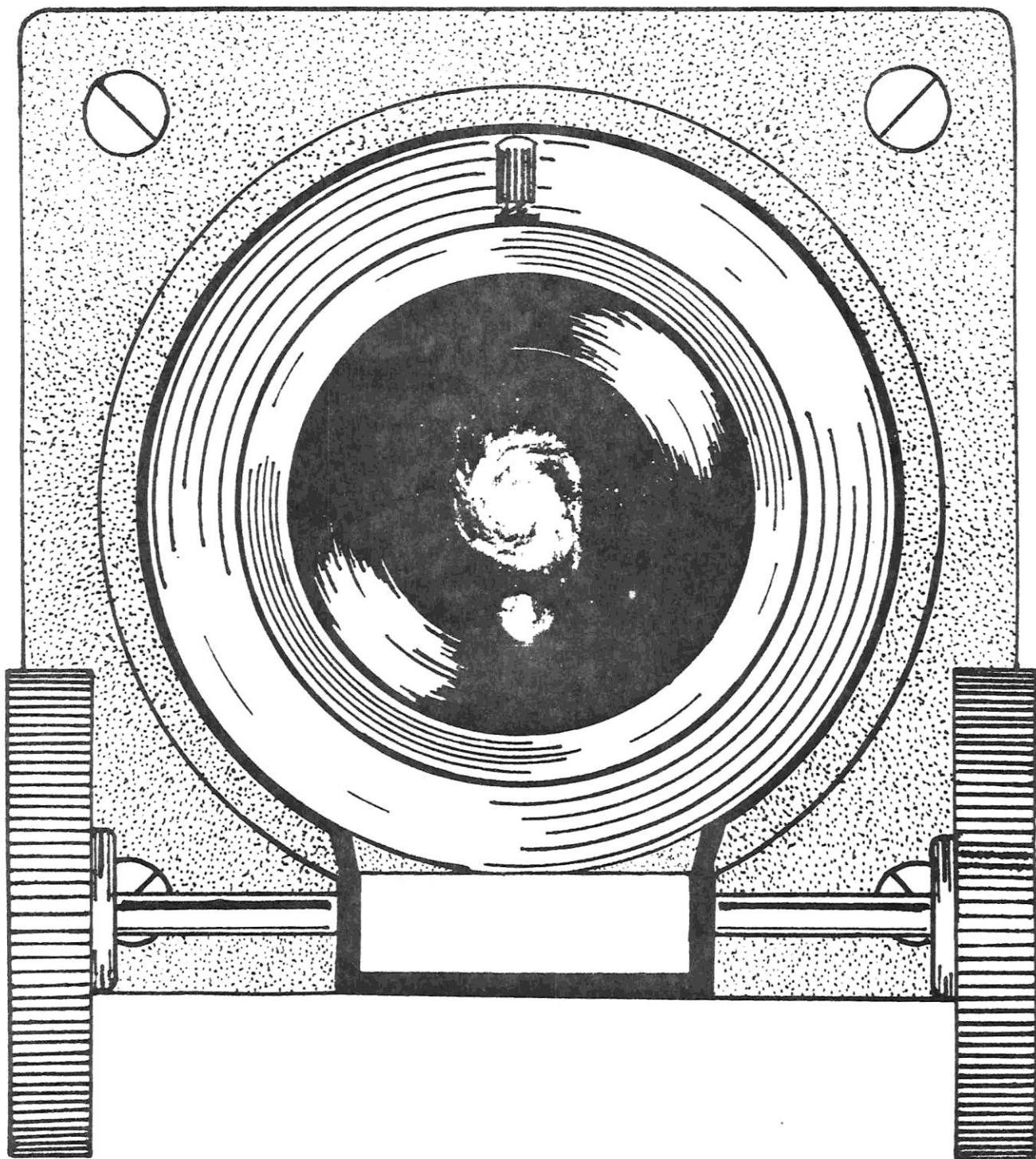


the **WASP**

THE MONTHLY JOURNAL OF THE WARREN ASTRONOMICAL SOCIETY



FEBRUARY 1975

The Warren Astronomical Society Paper (W.A.S.P.) is published monthly by and for the members of the Warren Astronomical Society. Subscriptions and advertisements are free to all Warren Astronomical Society Members. Non-member subscriptions and advertisements are available upon arrangement with the editors. Contributions, literary or otherwise, are always welcome.

The Warren Astronomical Society is a local, nonprofit organization of amateur astronomers. Membership is open to all interested persons. Monthly general meetings are held at Macomb County Community College usually in room 311 of "B" building.

<u>EDITORS:</u> Frank McCullough	Kenneth Wilson
34136 Clinton Plaza Dr.	11157 Grenada
Frazer, Michigan	Sterling Heights
48026	Michigan 48077
791-8752	268-9337

THIS MONTH'S COVER BY Kenneth Wilson. (the galaxy pictured in the eyepiece is M-51, the "Whirlpool Galaxy" in Canis Venatici.)

The Warren Astronomical Society maintains correspondence, Sometimes intermittently, with the following organizations:

THE ASTRO-GATOR ASTRONOMY CLUB

THE ASTRONOMICAL LEAGUE

THE FORT WAYNE ASTRONOMICAL SOCIETY

THE GRAND RAPIDS AMATEUR ASTRONOMICAL ASSOCIATION

THE KALAMAZOO ASTRONOMICAL SOCIETY

THE MIAMI VALLEY ASTRONOMICAL SOCIETY

THE OLGELTHORPE ASTRONOMICAL SOCIETY

THE OLYMPIC ASTRONOMICAL SOCIETY

THE ORANGE COUNTY ASTRONOMICAL SOCIETY

Other organizations are invited to join this list. The editors of the W.A.S.P. will exchange copies of this publication with other club publications on an even exchange basis.

COSMIC CALENDAR . . . by Ken Wilson

FEB

- 3 Last Quarter Moon.
- 6 Messier Club meeting, contact Frank McCullough (791-8752) for details.
- 11 Thomas A. Edison, born in 1847 (invented light pollution). New Moon.
- 13 Astrophotography Club meeting, contact Larry Kalinowski (776-9720) for details.
- 15 Galileo Galilei, born in 1564.
- 19 Nicolaus Copernicus, born in 1473. First Quarter Moon.
- 20 W.A.S. General Meeting 8 p.m. at St. Paul's United Church of Christ, 31654 Mound Rd., in Warren. This month's topics: Mirror figuring (G. Alyea) and Stars (L. Faix). Contact Louis Faix (781-3338) for further information.

SALUTE OF THE MONTH

This month's salute goes to a new Warren member, John Searles. John is an active member of the Adams Astronomical Society in Toledo, Ohio. Most of us got to know him at the 1974 National Convention of the National Astronomical League held in East Lansing this past summer. John was quick to lend a helping hand during the convention, usually without even being asked. Since the convention, he has shown a dedication equaled by few other members; he drives the distance from Toledo to attend the monthly general meetings. We could use a few more members like John.

-k.w.

FOR SALE: One 6 X 30mm Criterion finder with adjustable mounting rings. \$15. 268-9337. Ask for Ken.

FOR SALE: One 15-60 X 60mm zoom spotting telescope with alt-azimuth mount and slow motions. \$20. 268-9337, ask for Ken.

THE ASTROPHOTOGRAPHERS CORNER

by
Larry F. Kalinowski

PART II - THE AFOCAL METHOD

The afocal method is by far the quickest and easiest method of through-the-telescope photography to set up. With fast film and a bright subject like the Moon, you don't even have to fasten your camera to the telescope. It can be hand held and some excellent pictures can result, provided the photographer has a steady hand. However, there are some precautions that must be taken.

First, the telescope eyepiece must be focused on the subject to be photographed. Second, the camera lens must be focused for infinity or the farthest distance possible. Some low cost cameras have a picture showing a group of people near the focusing portion of the camera. Instamatic users won't have to worry about focusing, the lens is fixed.

Instamatic type camera users will also find that their pictures will have to be limited to bright objects like the Moon, Sun or daytime subjects on the Earth. There are only two shutter speeds on these low cost cameras. When flashcubes are used, the camera shutter is 1/45 of a second, without flashcubes, 1/90 of a second. A used flashcube can be inserted in the camera to make use of the slower shutter speed when taking Moon photos.

The more advanced camera bugs will better appreciate the afocal method because more expensive cameras have a large range of shutter speeds to choose from making the camera capable of photographing a greater range of subjects, like eclipses and planets. This writer doesn't recommend hand holding the camera at the telescope if the exposure time must be longer than 1/30 of a second. The camera must be fixed to a tripod, or better yet, to the telescope and a motor drive used to keep the telescope pointed at that heavenly body. You'll find that the Earth's rotation, as imperceptible as it seems to be, will be greatly magnified by the telescope, easily ruining the image recorded on the film. Some sort of drive motor becomes a must when exposures become longer than 1/30 of a second.

In order to determine how long your exposure must be, some simple calculations must be made. Start with your telescope magnification. (Sometimes called telescope power)

$$TM = \frac{FL_m}{FL_e}$$

Where: TM is the telescope magnification, FL_m is the focal length of the mirror and FL_e is the focal length of the eyepiece. It is suggested that all measurements be made in inches.

THE ASTROPHOTOGRAPHERS CORNER (cont'd)

With the magnification now known, the effective focal length can now be determined.

$$EFL = TM \times FL_{cl}$$

Where: EFL is the effective focal length, and FL_{cl} is the focal length of the camera lens.

On most thirty-five millimeter type cameras, the focal length of the lens is usually around two inches. Instamatic cameras (not the pocket type) have a focal length of about one and a half inches. If you're not sure what the focal length of your standard lens is, it can be approximated by measuring the distance across the negative of one of your past pictures. The measurement must be made diagonally, from one corner to the opposite corner.

Finally the f-ratio of your system can be calculated.

$$f \text{ ratio} = \frac{EFL}{D_m}$$

Where: D_m is the diameter of your mirror.

With the f ratio finally calculated, all that remains is to look up the proper shutter speed needed' in your copy of THE L.F.K. ASTRONOMICAL EXPOSURE GUIDES.

One more thing, after you've taken a few pictures, you'll probably notice that some or all of your pictures will have a noticeable darkening around the outer edge of your prints or slides. This is a common problem called vignetting. All the light coming out of the eyepiece isn't getting to the film. The problem can be solved or greatly eliminated by using the proper camera distance from the eyepiece. With the telescope pointed and focused at the Moon, hold a piece of white paper about an inch from the eyepiece. You'll see a spot of light on the paper. Move the paper backwards or forwards until that spot of light is sharp all the way around its edge. That point is where the camera diaphragm must be positioned. Notice I said diaphragm, not camera lens. The diaphragm is usually located in the center of the camera lens on the more expensive cameras and behind the lens on the low cost cameras. All the light will get to the film if the diaphragm is positioned properly, assuring more professional results. Other factors contribute to vignetting, however, there isn't enough space to go into a detailed account. The reader is advised to consult one or more of the many advanced astrophotography journals for further information.

CONSTELLATION of the MONTH

Reproduced by

Frank McCullough

Auriga---The Charioteer

Location – A line drawn from δ to α Ursae Majoris, and prolonged about 45° , ends near the brilliant 1st Magnitude star Capella, in the constellation Auriga. The star is unmistakable, having no rival in brightness near it.

MYTHOLOGY

The constellation of Auriga is extremely ancient. According to the Greek Legend the figure represents Erichthonius, fourth King of Athens, the son of Vulcan and Minerva. He was deformed, it is said, and his inability to walk with ease led him to invent the four horse chariot. His invention secured for him a place in the sky, the celestial Hall of Fame.

His art great Jove admir'd, when first he drove
His rattling carr, and fixt the youth above.

According to another story, Auriga was the son of Mercury, and the Charioteer of Oenomaus, King of Pisa. He was reputed to be most skillful in the training of horses, and those trained by him were the fleetest steeds in Greece.

The constellation Auriga appears in the Greek star lists of Eudoxus (4th Century B.C.) and Aratos (3rd Century B.C.).

The star Capella has an interesting history. Mythologically, it represents the She Goat which suckled the infant Jupiter. The story runs that, having in play broken off one of the Goat's horns, Jupiter endowed the horn with the power of being filled with whatever the possessor might wish, whence it was called the "Cornucopia," or "Horn of Plenty."

In India, Capella was worshipped as the Heart of Brahma. The ancient Peruvians called it "Colca" and connected it with the affairs of Shepherds. English poets have also alluded to it as the "Shepherd's Star."

On an old tablet in Akkadian there is inscribed an allusion to Capella, it being designated as the "Star of Stars". This is the most ancient reference to the star extant.

Capella's place on the Denderah Zodiac is occupied by a mummified cat in the outstretched hand of a male figure crowned with feathers. The star was the object of worship in the great temple of Karnak in Egypt. To the Arabs Capella was known as the "Driver", because it seemed to rise earlier than the other stars and so, apparently, watched over them; or, still more practically, as the "Singer" who rode before the procession cheering on the camels, which last were represented by the Pleiades.

Capella was regarded by the early astrologers as having a stormy character, and associated with inclement weather, and it was sometimes called the "Rainy Goat Starre". It portended civic and military honors and wealth.

FOR THE UNAIDED EYE AND FIELD GLASS

Auriga is a beautiful and conspicuous constellation. It is characterized by a clearly defined pentagon of stars. Note the three 4th magnitude stars near Capella forming a triangle. They were known to the Arabs as the "Kids".

The star Nath, or β Tauri, is common to the constellations Auriga and Taurus. It represents the right foot of the Charioteer, and one of the tips of the Bull's horns.

On the night of January 23, 1892, Dr. Anderson discovered a new star a few degrees from β Tauri at a point about 1/5 of the distance between that star and θ Aurigae. It reached 4th magnitude in April. In August, Corder found that it had risen again in brightness to 9th magnitude. From observations made at the Lick Observatory the spectrum of this Nova resembled that of a planetary nebula. Investigation showed that it appeared also as a bright star (about 4th mag.) on a photograph taken at Harvard Observatory on December 10, 1891; and a photograph taken December 8, 1891, showed it to be 13th magnitude.

The feature of the constellation Auriga is α Aurigae or Capella, meaning the "She Goat". Eudokia thus praises it: "And scarce a star with equal radiance beams upon the earth."

In northerly latitudes it is visible at some time every clear night, through-out the year. Of the 1st magnitude stars it is nearest to the Pole, and it rises almost exactly in the northeast. Capella is about 42 light years distant and is receding from us at the rate of about 19 miles a second. Its spectrum is much like that of our sun and it is 150 times brighter.

In brightness, Capella ranks 3rd of all the stars seen in northerly latitudes. Its magnitude is 0.2.

Capella is really a binary too close for telescopic observation. The companion was detected by the spectroscope. These two bodies form a double system, the components moving in orbits about their common center of gravity. The orbital period is 104 days. These close companion stars are in approximately the same physical condition, and almost of the same mass.

Ptolemy, El Fergani (10th Century) and Riccioli have all called Capella a red star. To us it appears brilliantly yellow or golden in color. Capella culminates at 9 P.H. on January 22nd.

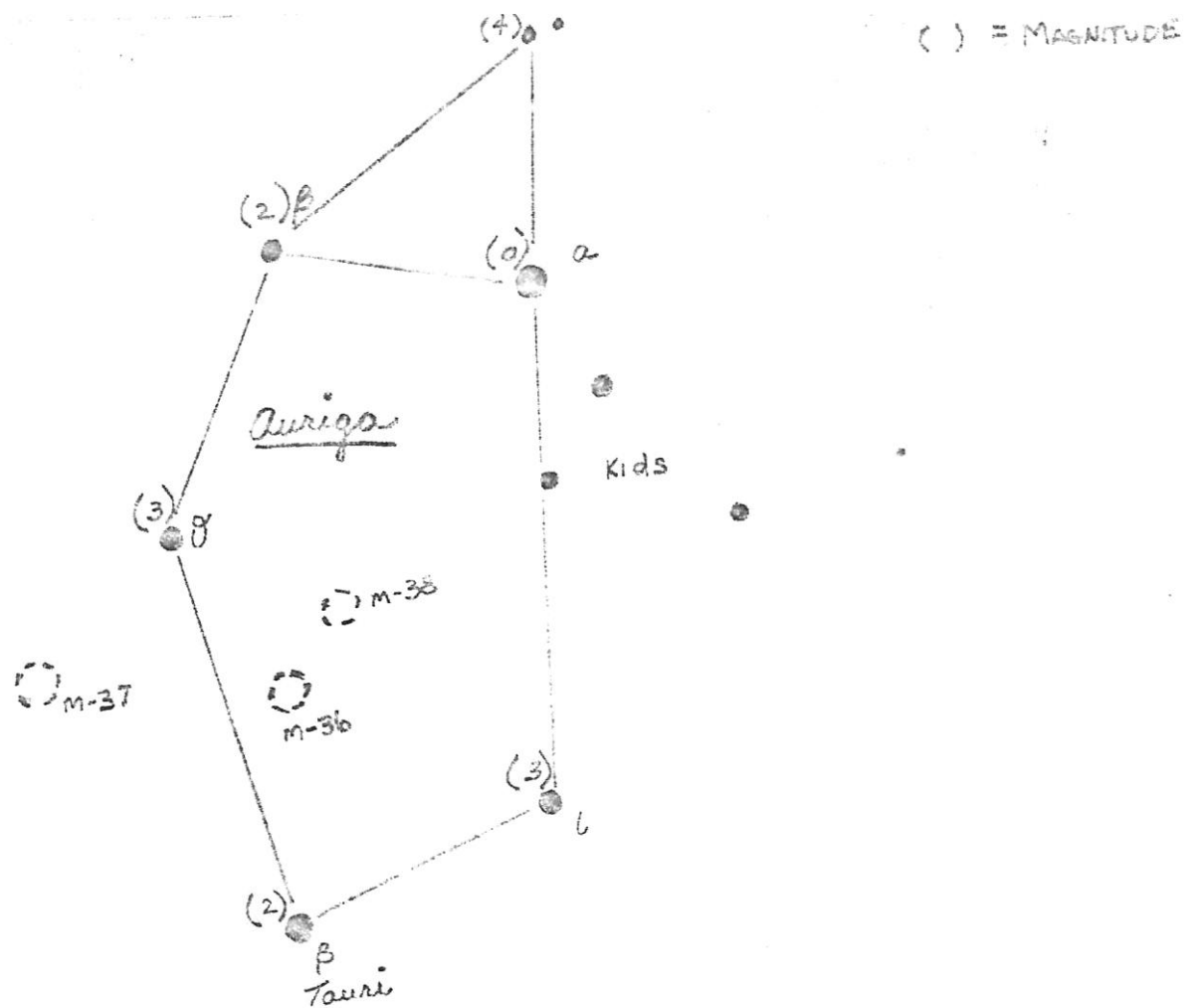
β Aurigae is a star of special interest. It consists of a pair of stars of equal size and brightness, and very nearly equal mass, which revolve around their common center of gravity, with a period of about 4 days, and mutually eclipse one another at every revolution.

ϵ Aurigae is an eclipsing variable with one of the longest periods known for that type of variable - about 27 years.

ζ Aurigae also is an interesting eclipsing variable with a period of 972 days.

The region in the vicinity of ι Aurigae is an interesting one for those who have an opera or field glass.

Taken from: William T. Olcott's FIELD BOOK OF THE SKIES



Warren Astronomical Society

Slide Processing

20 exposures \$1.75

36 exposures \$2.50

Call: 771-8752

Send: 50136 Clinton Plaza Drive 48026

SPECTACULAR PLANETARY CONFIGURATIONS IN JANUARY AND FEBRUARY, 1975

The planet Mercury is usually so hard to find that many professional astronomers have never seen it. This January, you have a rare chance to spot it easily, which you can use even if you don't know a single constellation. Every night from January 10 through 27, bright, easy-to-find Venus will guide you to Mercury. If you want to see it, though, look every night you can; don't put it off until the very best nights (Jan. 17 and 18, as described below). Even a little haze near the horizon will make it difficult to spot Mercury-and in winter in Michigan, most nights are not just hazy but solidly overcast.

To see Mercury or anything else in the sky, you need an observing site absolutely free of lights. In addition, the horizon (at least to the WSW) must be unblocked by buildings or trees. Parking structures, housetops, hills, and fire towers are often good locations. Once you have a good spot, go there around 6:30 p.m. any night from Jan. 10 to 27 and look low in the WSW sky. You should have no trouble finding Venus, a brilliant white (or yellowish) point of light far brighter than anything else in the sky. If you do have trouble finding it, or you see it but it is faint, go home and try again tomorrow; there's haze. But if Venus is as bright as it should be, look near it for Mercury, which will appear as an orange "star" much less brilliant than Venus but still brighter than anything else in the immediate vicinity and easily visible once you've located it. Every night from Jan. 10 to 27, Mercury is so close to Venus that a 50¢ piece held at arm's length will cover both of them, and some nights they're even closer than that; on the 17th and 18th, an aspirin tablet will do! Mercury is below Venus and a little to the right from the 10th through the 16th, due right and very close on the 17th and 18th, right and a bit above from the 19th through the 23rd, due right again on the 24th, and right and a little below from the 24th through the 27th.

The most beautiful appearance will come when Mercury is closest to Venus, on the 17th and 18th. Those two nights, the pair will look like a spectacular double "star": two differently colored bright points of light 12 times closer together than the two "Pointer" stars of the Big Dipper. Of course, the two planets are not really sitting next to each other in space on those nights; Venus is actually 45 million miles behind Mercury. It's just that on those nights they happen to lie in almost exactly the same direction from Earth, just as an airplane may seem to fly across the Moon even though it is actually much closer. (To put it another way, on those two nights Venus, Mercury, and Earth form an almost perfect straight line in space, with Mercury 104 million miles from Earth and Venus 149 million.) Such an arrangement, in which two planets appear almost together in the sky, is called a conjunction. It's not particularly rare (though one this close is not common) but it's pretty when it happens. The next one is the very next month and is even more spectacular. On February 17 the two brightest "star like" (point) objects in the sky, Venus and Jupiter, will appear even closer together (in fact, less than half as far apart) as Venus and Mercury in January look low in the western sky a bit after 7 p.m. Again, the planets are nowhere near each other in space; on Feb. 17, Venus is 139 million miles away and Jupiter 404 million miles behind it. Similarly interesting events happen frequently in the sky (e.g. two total Lunar eclipses occur in 1975, the first visible from Michigan in three years). A superb source of information on them, worth far more than its modest \$2-a-year cost, is the monthly "Sky Calendar" published by Abrams Planetarium, Michigan State University, East Lansing, Mich., 48824. It was my source for most of the information above. Or try your library for amateur-astronomy magazines, particularly Sky and Telescope.

James A. Loudon

SKY CALENDAR FEBRUARY 1975

Information for helping teachers and students observe the sky

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<p>Evening Planets: Venus, the brightest of all the planets, is in western sky at dusk and sets shortly after sky becomes entirely dark. Jupiter, nearby, is not as bright as Venus, but is still brighter than Sirius, the brightest star. Look for Jupiter to upper left of Venus until Feb 17, when they will form closest planetary conjunction for 1975. After Feb 17 Jupiter will appear to lower right of Venus. The relative motion of Venus and Jupiter is 1° per day all month. Have students observe Venus and Jupiter and make nightly drawings showing their positions relative to horizon. By Feb 28 Jupiter will set before twilight ends. Saturn appears as brightest "star" in Gemini, and is well up in eastern sky at dusk. Mercury: See Feb 1, 2.</p>			<p>Morning Planets: Faint red Mars rises in ESE to SE shortly before morning twilight begins. Look for Mars 10° up in SE 1 hr before sunrise. Mercury visible last past of month. See Feb 20, 23.</p>	<p>Take a photograph of Venus and Jupiter one hour after sunset every few nights. Use a lens opening of f/1.2 to 2.8 and a 5 to 15-second exposure with High-Speed Ektachrome.</p>	<p>Around Feb 1, use last month's map 1-3 hrs after sunset and this month's 4-6 hrs after sunset. See Feb 14-15. Around Feb 28, use this month's map 1½-3½ hrs after sunset.</p>	<p>1 hr before sunrise: 1 Spica within 5° of moon. --- 45 min after sunset: Face WSW. Note bright Jupiter 16° upper left of brilliant Venus, and faint Mercury 9½° lower right of Venus. Binoculars help for Mercury.</p>
<p>Venus and Jupiter 15° apart to night. Mercury, now too faint and too close to sun to be seen, passes inferior conjunction (between earth and sun) Feb 8. It emerges into morning sky late in month (see Feb 20).</p>	<p>1 hr before sunrise: Moon about midway between Spica and Antares, which are 46° apart. At sunrise, note Last Quarter moon is 90° to right (west) of sun. Note moon's shape.</p>	<p>1 hr after sunset: 4 ● Jupiter (13° apart in WSW) ◆ Venus</p>	<p>1 hr before sunrise: 5 Antares about 6° from moon. Faint Mars 28° lower left of moon. The name Antares means "rival of Mars". Note reddish color of both.</p>	<p>1 hr after sunset: 6 ● Jupiter (11° apart) ◆ Venus</p>	<p>1 hr before sunrise: 7 (Face southeast.) Mars ●</p>	<p>1 hr before sunrise: 8 Mars ●</p>
<p>Last chance to see waning crescent moon. It rises in ESE about 1 hr before sunrise. --- Venus and Jupiter now 8° apart in western evening sky.</p>	<p>10 New Moon tonight. Moon sets very close to time of sunset and dark side is toward us, so moon can't be seen. Venus-Jupiter 7° apart tonight.</p>	<p>11 With very clear sky you might see very thin waxing crescent moon. Using binoculars look very low, 10° south of due west ½ hr after sunset. Venus-Jupiter 6° apart tonight.</p>	<p>1 hr after sunset: 12 (planets 5° apart) Jupiter ● Venus ◆</p>	<p>1 hr after sunset: 13 (planets 4° apart) Jupiter ● Venus ◆</p>	<p>14 Venus-Jupiter only 3° apart tonight. Last month's map shows sky about 45 min after sunset in mid-February.</p>	<p>15 Venus-Jupiter 2° apart tonight. This month's map shows sky nearly 4 hrs after sunset in mid-February. Watch moon each night tonight thru Feb 27 and plot its position on star map.</p>
<p>1 hr after sunset: 16 (planets 0.9° apart) Jupiter ◆ Venus ◆</p>	<p>17 Venus and Jupiter form a spectacular close pair, only 0.2° apart in western evening sky. They appear close, but Venus is 139 million miles, and Jupiter 543 million miles from earth tonight.</p>	<p>18 Moon at First Quarter tonight. At sunset, note moon nearly 90° from sun. As sky darkens note Pleiades (Seven Sisters) close to moon. Venus-Jupiter 1.2° apart tonight.</p>	<p>19 Aldebaran, the bright reddish eye of Taurus the Bull, is 5° south of the moon this evening. Venus-Jupiter 2° apart tonight.</p>	<p>20 45 min before sunrise: Look for Mercury very low ESE, 18° to lower left of Mars. Binoculars help. In next few days, Mercury brightens noticeably and becomes easier to see. Venus-Jupiter 3° apart tonight.</p>	<p>21 Venus-Jupiter 4° apart tonight. --- 1 hr after sunset: Moon ○ ● Castor ● Saturn ● Pollux</p>	<p>22 Venus-Jupiter 5° apart tonight. --- 1 hr after sunset: ● Castor ● Saturn ● Pollux ○ Moon</p>
<p>23 This week and next, Mercury about 15° to lower left of Mars. Look very low ESE 45 min before sunrise. See diagram after Feb 28. Venus-Jupiter 6° apart tonight.</p>	<p>24 Tonight and tomorrow night, bright star near moon is Regulus, in Leo. Since moon is near perigee, it moves 15° in 24 hrs. Moon's average daily motion is 13°. Venus-Jupiter 7° apart tonight.</p>	<p>25 Full Moon, at opposition, is 180° from sun. Moon rises in E at sunset tonight and sets in W at sunrise tomorrow. Venus and Jupiter 8° apart tonight.</p>	<p>26 At sunset at this time of year, the moon's orbit is inclined at a steep angle to the horizon. Therefore the moon rises more than an hour later each night, unlike the Harvest Moon. Venus-Jupiter 9° apart tonight.</p>	<p>1 hr after sunset: 27 (planets 10° apart) Venus ◆ Jupiter ●</p>	<p>28 Jupiter disappears from evening sky in March. On what date will you last see it? Look 11° lower right of Venus tonight. Moon, with Spica close by, rises within 4 hrs after sunset.</p>	<p>45 min before sunrise, last week of Feb and first week of March (face ESE): Mars ● Mercury ●</p>

Magnitudes of the planets at midmonth: Venus -3.4; Jupiter -1.6; Saturn 0.0; Mars +1.5
Magnitude of Mercury: Feb 20 +1.0; Feb 28 -0.5
Motions of planets against star background: Venus 35° eastward, and Jupiter 6° eastward, from Aquarius into Pisces. Saturn retrograde 1.3° in Gemini. Mars moves 21° eastward in Sagittarius.