

## ASTRONOMY

# Vega, Brightest Star, Overhead

Venus, Saturn, Jupiter and Mars appear in the August sky and Vega, the brightest of the visible stars shines overhead in the constellation of Lyra, James Stokley reports.

► WITH THE COMING of August the sun sets earlier than it did at the beginning of the summer, and the longer evenings give a good opportunity to see three bright planets. These are Venus, Jupiter and Saturn. And in the middle of the night, while the last two are still visible in the west, Mars rises in the east.

Venus, brightest of this quartet, appears low in the west soon after sunset—and long before any other star or planet is visible. It is not on the accompanying maps for they show the sky as it looks about 10 p.m., your own kind of standard time (add one hour for daylight saving time) at the beginning of August; an hour earlier at the middle and two hours earlier at the end of the month. By these times, Venus has dropped below the horizon.

## Venus Much Brighter

At the start of August Jupiter becomes visible in the east at about the same time that Venus is going out of sight. By the end of the month, however, both planets will be visible at the same time, in the gathering dusk. Only Venus, more than three and a half times as brilliant, is brighter than Jupiter, which can thus be easily located—in the southeast in the constellation of Aquarius, the water-carrier.

Saturn is a little to the right, in Capricornus, the sea goat. It is about a twelfth as bright as Jupiter, but still equals a bright star of the first magnitude.

If you have a clear view in that direction you will see Mars low in the east about 1:00 a.m., standard time. It is less than half as bright as Saturn—about equal to a faint star of the first magnitude. At the beginning of August it is in Taurus, the bull; then it moves into Gemini, the twins.

Vega, which is directly overhead in the constellation of Lyra, the lyre, is the brightest of the stars now visible. Nearby are Deneb, in Cygnus, the swan, toward the northeast; and Altair, in Aquila, the eagle, to the southeast. Low in the southwest, in Scorpius, the scorpion, you will see Antares, distinctly red in color. It is also of the first magnitude, but its low altitude makes it look somewhat fainter.

Over in the west is Arcturus, in Bootes, the herdsman. And next to this group, in the northwest and a little lower, is the great bear, Ursa Major. In it is the great dipper. A little higher and farther right is the little dipper, part of the lesser bear, Ursa Minor. Polaris, the pole star, is at the end of the little dipper's handle. Farther right is Cepheus, the king, and his queen, Cassiopeia.

To the south, just to the left of Scorpius, you can see Sagittarius, the archer. It is hard

to imagine these stars forming such a figure, particularly the kind of an archer that was represented on the old star maps. They pictured him as a centaur! But you can see a teapot. The spout of the pot extends to the right, just above the curled tail of the scorpion. The lid is toward the constellation of Scutum, the shield, above, while the handle of the teapot is on the left, towards Saturn. Here also is another dipper. The four stars of the handle form the bowl of the "milk dipper," while the two stars to the right (of the lid) are the handle. Perhaps this is called a milk dipper because this is the brightest part of the Milky Way.

In competition with the bright lights in and around a large city, the Milky Way is generally invisible. But get out into the country, away from the city's glare and smoke. At this time of year it can be traced from the northeastern sky, in the constellation of Perseus, through Cassiopeia, Cepheus, Cygnus and Aquila, into Sagittarius.

If you look at the Milky Way through even a small telescope you will find that it consists of a vast swarm of stars. Most of them are not visible to the naked eye, but there are so many that they form a pathway of light.

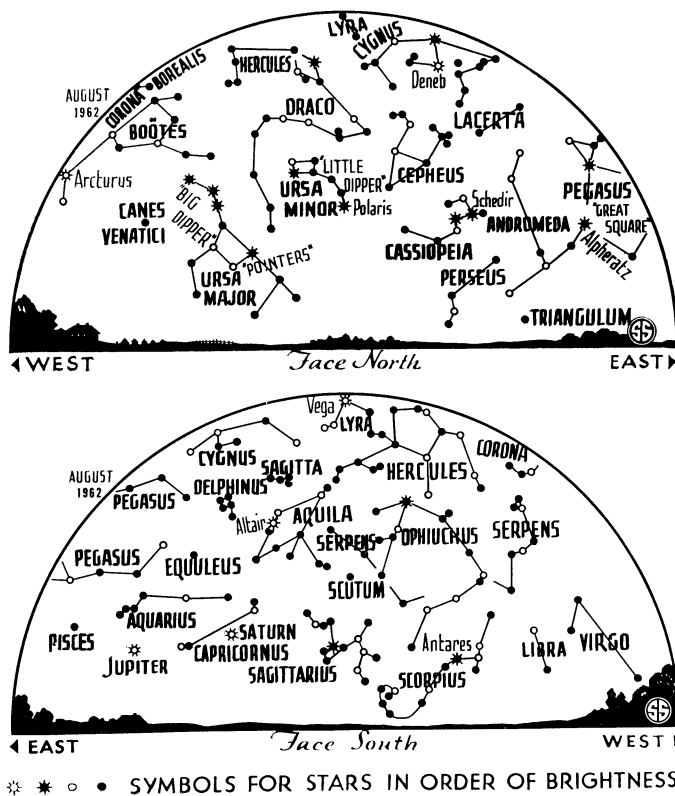
The Milky Way is really the main part

of the Galaxy, the stellar system in which we live. If you hold two soup plates together, facing each other, you have a pretty good model of this system of something like a hundred billion stars. Its diameter is about 100,000 light years. That is, a beam of light, traveling 186,000 miles every second, would take 100,000 years to cross it. It is about 10,000 light years thick at the center. The sun, with its accompanying planets, is nearly in the central plane, but about two-thirds of the way out from the center to the edge.

Understanding this, you can see why the Milky Way presents the appearance that it does. As we look toward the rim of the Milky Way galaxy we are looking into a depth of stars extending from 20,000 to 80,000 light years. But when we look toward the sides they only reach to 1,000 or 2,000 light years. Thus we cannot see nearly as many stars as we do toward the center. There they are far more concentrated, which produces the Milky Way effect. It is brightest toward Sagittarius, for that is the direction of the center, where the stars are most numerous.

When astronomers refer to the Milky Way galaxy, they usually use just Galaxy spelled with a capital letter, but there are millions of other galaxies beyond it, scattered through space.

One of these, and a close neighbor, is in the constellation of Andromeda, seen low in the northeast. When higher in the sky, if



the night is dark and clear, you can see it with the naked eye as a hazy spot of light. But photographs through great telescopes are required to bring out its detail, and to show its structure, which is a spiral.

Astronomers formerly thought that our Galaxy was considerably bigger than the one in Andromeda. But no longer. Actually, they had underestimated Andromeda's distance, which they put at about 800,000 light years. Now it turns out to be about three times as far. Therefore, to look the same apparent size in the sky, it has to be larger. In fact, it now seems that the Milky Way is the smaller of the two.

### Celestial Time Table for August

August	EST	
4	3:00 a.m.	Moon passes north of Venus
5	1:00 a.m.	Moon farthest; distance 251,900 miles
8	10:55 a.m.	Moon in first quarter
12	early a.m.	Meteors visible apparently radiating from Perseus
14	2:00 p.m.	Moon passes north of Saturn
15	3:10 p.m.	Full moon
16	6:00 p.m.	Moon passes south of Jupiter
17	3:00 a.m.	Moon nearest; distance 224,000 miles
22	5:27 a.m.	Moon in last quarter
24	5:00 p.m.	Moon passes south of Mars
29	10:09 p.m.	New moon
31	10:00 a.m.	Jupiter opposite sun and nearest earth; distance 370,200,000 miles

Subtract one hour for CST, two hours for MST, and three hours for PST.

• Science News Letter, 82:58 July 28, 1962

Alligator weed and water-hyacinth are the worst aquatic weeds in the U.S. Southeast.

A new hormone drug which puts weight on people and has virtually no masculinizing effects has been discovered.

The atmospheric density can be measured by the rate of change of the period of a satellite as it orbits the earth caused by collisions with the atoms and molecules of the atmosphere.

## Questions

**ASTRONOMY**—Why is the Milky Way brighter toward Sagittarius? p. 58.

**GEOLOGY**—How many feet has the Franz Joseph Glacier retreated since 1951? p. 57.

**MEDICINE**—What is myleran? p. 53.

**PHYSICS**—What new weapon is being used by scientists to fight insect pests? p. 61.

**PUBLIC HEALTH**—What diseases are caused by air pollution? p. 55.

**SPACE**—How would a search for protein be made on Mars? p. 56.

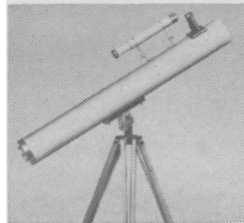
Photographs: Cover, Martin Company; p. 50, North American Aviation, Inc.; p. 51, Argonne National Laboratory; p. 53, University of Pennsylvania; p. 54, General Dynamics Corporation; p. 55, Los Angeles County Air Pollution Control District; p. 61, Automobile Manufacturers Association; p. 64 (top), Kusan, Inc.; p. 64 (bottom), E. P. Haddon.

## GET READY FOR THE SPACE and SCIENCE ERA! SEE SATELLITES, MOON ROCKETS CLOSE-UP

# AMAZING OPTICAL BUYS

### and OTHER SCIENTIFIC BARGAINS

See the Stars, Moon, Planets Close Up!  
**3" Astronomical Reflecting Telescope**  
(Famous Mt. Palomar Type)

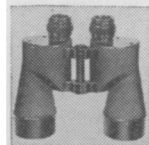


**60 to 180 Power**  
**An Unusual Buy!**

Assembled—Ready to use! You'll see the Rings of Saturn, the fascinating planet Mars, huge craters on the Moon, Star Clusters, Moons of Jupiter in detail, Galaxies! Equatorial mount with lock on both axes. Aluminized and over-coated 3" diameter

high-speed f/10 mirror. Telescope comes equipped with a 60X eyepiece and a mounted Barlow Lens, giving you 60 to 180 power. An Optical Finder Telescope, always so essential, is also included. Sturdy, hardwood, portable tripod. FREE with Scope: Valuable STAR CHART plus 272-page "HANDBOOK OF HEAVENS," plus "HOW TO USE YOUR TELESCOPE" BOOK.

Stock No. 85,050-Q . . . . . \$29.95 Postpaid  
4 1/4" Reflecting Telescope—up to 255 Power  
Stock No. 85,105-Q, \$79.50 F.O.B. Barrington, N.J.



**Here's a Terrific Buy!**  
**WAR SURPLUS! American Model**  
**7 x 50 BINOCULARS**

Big savings! Brand new! Crystal clear viewing—7 power. Every optical element is coated. An excellent night glass—the size recommended for satellite viewing.

Individual eye focus. Exit pupil 7mm. Approx. field at 1,000 yds. is 376 ft. Carrying case included. American 7 x 50's normally cost \$274.50. Our war surplus price saves you real money.

Stock No. 1544-Q . . . only \$74.80 pspdp. (tax incl.)  
6 x 30 Binocular—similar to above and a terrific bargain—Stock No. 963-Q \$33.00 pspdp. (tax incl.)

**'FISH' WITH A MAGNET**  
**Go Treasure Hunting**  
**on the Bottom**



Great idea! Fascinating fun and sometimes tremendously profitable! Tie a line to our 5-lb. Magnet—drop it overboard in bay, river, lake or ocean. Troll it along the bottom—your "treasure" haul can be outboard motors, anchors, fishing tackle, all kinds of metal valuables. 5-lb. Magnet is war surplus—Alnico V Type—Gov't. Cost \$50. Lifts over 125 lbs. on land—much greater weights under water. Order now and try this new sport.

Stock No. 70,571-Q 5-lb. Magnet . . . \$12.50 Postpaid

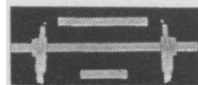


**NEW ZOOM MICROSCOPE EYEPIECE**  
**ZOOMS POWERS FROM 30X TO 2000X**

Greatest microscope accessory yet! Priced amazingly low. Combines all eyepiece powers from 10X to 20X in one assembly. Twist of dial . . . without more focusing . . . without extra eyepiece changing . . . and you command powers up to 2000X. Professional all-metal quality construction, heavily plated. Anodized. Fits any standard .917" dia. microscope tube. Built-in, adjustable clamping ring insures tight, mar-free attachment. Stops eyepiece changing. Coated elements, 2 3/4" long, 1 1/2" max. dia., 5 oz. wt.

Stock No. 60,270-Q . . . . . \$25.00 Postpaid

**ADJUSTABLE SPANNER WRENCH**



Remove Your Retaining Rings, Disassemble Lenses, Cameras, etc.

Made for U. S. Air Force—available at a fraction of Government cost. A top grade, versatile tool that every instrument and camera repair man or just plain tinkerer should own. Adjustable for 1/2" to 12" diameter retaining rings. Complete with six different pairs of points to fit all types of slots and holes, 3", 6" and 12" main bars. All steel and nicely plated. The finest tool we have ever come across for this type of retaining ring work AND a real bargain at our low price.

Stock No. 70,355-Q . . . . . \$12.50 Postpaid

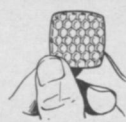
**MINIATURE WATER PUMP**



Wonderful for experiments, miniature waterfalls, fountains. HO gage railroad backdrops, etc. Tiny (2 1/2" x 1 1/4") electric motor and pump, ideal for hobbyists, labs, schools. Pumps continuous flow of water at rate of one pint per minute at a 12" head. With 2 D batteries in series will pump to 24" high. Runs 48 hours on battery. Works in either direction. Self priming.

Stock No. 50,345-Q . . . . . \$2.25 Postpaid

**SPELLBINDING EXPERIMENTS with SILICON SOLAR CELL AND SUN BATTERY!**



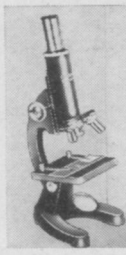
Experience endless fascination in converting sunlight into electricity to power small motors, amplifiers, etc. Ideal for scientific student projects. Plastic case 1 1/2" x 1 1/4" x 3/16". Produces .3 to .45 volts—10-16 milliamps. 24-page Handbook gives full data on 12 pat experiments.

Stock No. 9230-Q . . . . . \$2.00 Postpaid  
Selenium Photocell. Lower power, lower price than Silicon Cell.

Stock No. 30,411-Q . . . . . \$1.50 Postpaid  
Solar Cell and Photocell Handbook. Fascinating 112-page Handbook on Silicon-Cell and Selenium projects, demonstrations, etc. Explains photovoltaic theory, performance. Gives infrared and ultra-violet applications. Paperbound, 6" x 9".

Stock No. 9230-Q . . . . . \$2.00 Postpaid

**50-150-300 POWER MICROSCOPE**



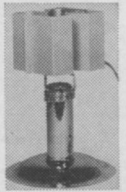
Amazing Value—3 Achromatic Objective Lenses on Revolving Turret! Imported! The color-corrected, cemented achromatic lenses in the objectives gives you far superior results to the single lenses found in the microscopes selling in this range. Results are worth the difference! Fine rack and pinion focusing.

Stock No. 70,008-Q—\$14.95 Pstpd.

**MOUNTED \$49.95 Pstpd. OBJECTIVE**

. . . Threaded for easy attachment on above microscope. Achromatic lenses for fine viewing. 3 mm. focal length.

Stock No. 30,197-Q . . . . . \$5.00 Pstpd.



**NEW . . . USABLE ELECTRICITY WITH CANDLE AS POWER SOURCE!**

Amazing Thermoelectric Generator produces current . . . from candle flame, or even a stream of heated air . . . to run transistor radios, transceivers, relays, etc. Lasts a lifetime—no moving parts to wear out or replace. Not affected by moisture, humidity. Use in camp, home, thermoelectric experiments. Candle, holder, base, 2 alligator clips incl.

Stock No. 70,561-Q . . \$19.95 Pstpd.



**NOW . . . EXCITING NEW COLOR EXPERIMENTS**

for Amateurs  
**AMAZING DIFFRACTION GRATING SAMPLE KIT!**

Miracle of light diffraction! Wonder material of the 20th century. Now you can develop spectacular color-coordinated schemes . . . produce iridescent decorative effects inside and outside the home . . . convert old, unwanted costume jewelry—earrings, cufflinks, pins, pendants and bracelets—into excitingly different, ever-glowing pieces of adornment. Yes, now you can bounce light off reflecting Diffraction Grating Replica in all the scintillating brilliance of rainbow colors. Kit contains 8 1/2" x 5 1/2" pieces of transmission (see-through) and reflecting type grating, mounted circular gratings, unmounted transmission and reflecting type gratings, round pieces of mounting glass, double-faced mounting tape, stereo viewer; Edmund Diff. Grating Idea Book.

Stock No. 70,563-Q . . . . . \$5.00 Postpaid



**INTRIGUING LOW-COST MOON MODEL**

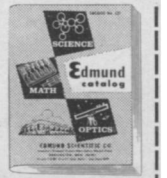
Exciting outer space display and conversation piece. Exact replica, 30,000 formations—peaks, craters, Ocean of Storms, etc.—all in relief. Scaled to size. Accurate distance relationships. Proper lighting shows moon phases; "black light" produces startling effects. Tough, washable plastic. Three colors. Far side blank—can be used for space data. Excellent gift item. 12" dia., wt. 3/4 lb.

Stock No. 70,515-Q . . . . . \$12.50 Postpaid

**VISIT AND SEE THE FAMOUS EDMUND RAINBOW SHOWPLACE SEATTLE WORLD'S FAIR—**  
**April 21 to Oct. 21**

**MAIL COUPON for FREE CATALOG "Q"**

160 Pages! Over 1000 Bargains  
**EDMUND SCIENTIFIC CO.,**  
Barrington, New Jersey  
Please rush Free Giant Catalog Q.



Name . . . . .  
Address . . . . .  
City . . . . . Zone . . . State . . .

ORDER BY STOCK NUMBER . SEND CHECK OR MONEY ORDER . SATISFACTION GUARANTEED!

**EDMUND SCIENTIFIC CO., BARRINGTON, N. J.**