

## ASTRONOMY

# Jupiter, Saturn Shine in August

The planet Jupiter is the brightest object in the sky next to the moon during August. Saturn is as bright as a first magnitude star, James Stokley reports.

► **TWO BRIGHT PLANETS**—Jupiter and Saturn—have joined with the stars normally visible at this time of year to make the evening skies of August especially brilliant.

Both planets, and the stars as well, are shown on the accompanying maps. These depict the skies as they appear about ten p.m. your own kind of standard time (add one hour for daylight saving time) at the first of August, an hour earlier at the middle of the month and two hours earlier as the month comes to an end.

Jupiter has a magnitude of minus 2.3, on the scale used by astronomers for rating the brilliance of celestial objects. Thus is far brighter than any other object in the evening sky except the moon, so Jupiter is easy to identify. It has been in the constellation of Capricornus, the horned goat, but in August moves next door into Sagittarius, the archer, in the southern sky.

About five degrees to the west (right) is Saturn. Its magnitude is plus 0.4 so it ranks with the first-magnitude stars; however, it is about a twelfth as bright as Jupiter. Both of these planets are visible as soon as it gets dark, and remain in view until shortly before sunrise.

The stars in Sagittarius outline a teapot. The handle is toward Saturn, and the spout to the right, toward the next constellation of Scorpius, the scorpion. In the left-hand end of this group, the stars are in a curved line, which forms the scorpion's tail. That is the way the figure was pictured in the old star maps. The modern astronomer, of course, ignores these picturesque old figures, of lions, bears and dogs as well as scorpions.

At the center of the scorpion is a bright star, red in color, called Antares, which is about half as bright as Saturn.

Looking higher in the southern sky, you can see two other stars of the first magnitude. Directly above Jupiter is Aquila, the eagle, with brilliant Altair. And still higher—virtually overhead, in fact—you find Vega, in Lyra, the lyre. Below this group, toward the east, is Cygnus, the swan, shown partly on the southern map, partly on the northern. It is on the latter that Deneb, the brightest star in Cygnus, is shown.

The big dipper, which is a part of Ursa Major, the great bear, shines in the northwest. In it are the pointers, the two stars in the dipper's bowl that show the direction of Polaris, the pole star. Although of second magnitude, this is a well-known orb, because it always stands in about the same position in the north.

If you follow the handle of the dipper, and continue its curve to the left, it will bring you to another star of the first magnitude. This is Arcturus, in Bootes, the herdsman.

Stay up late on August nights and you may see another planet, for Venus rises in the east about three hours before the sun. Its magnitude is now about minus 3.5 which makes it about three times as bright as Jupiter. Venus, Jupiter and Saturn are the only planets now visible; the other two that are sometimes visible without a telescope, Mercury and Mars, are too nearly in the sun's direction to be seen.

From about the middle of August to the end, the moon will shine in the sky during evening hours. On Friday, Aug. 25, it will be full, rising in the east as the sun is setting in the west.

During that night the moon will pass through the shadow of earth, producing a lunar eclipse. At 10:09 p.m., EST, the eclipse will be at its height. It will not be quite totally eclipsed as a narrow sliver of the moon's surface will remain illuminated by the direct rays of the sun.

The shadow of our planet actually has two parts. That shown is the inner part, the umbra, where the globe would completely hide the sun. But around it is a larger region, called the penumbra, where the sun is only partly hidden. At 7:37 p.m. EST the moon starts to enter the penumbra. In the western part of the United States, of course, the moon will not have risen when this happens.

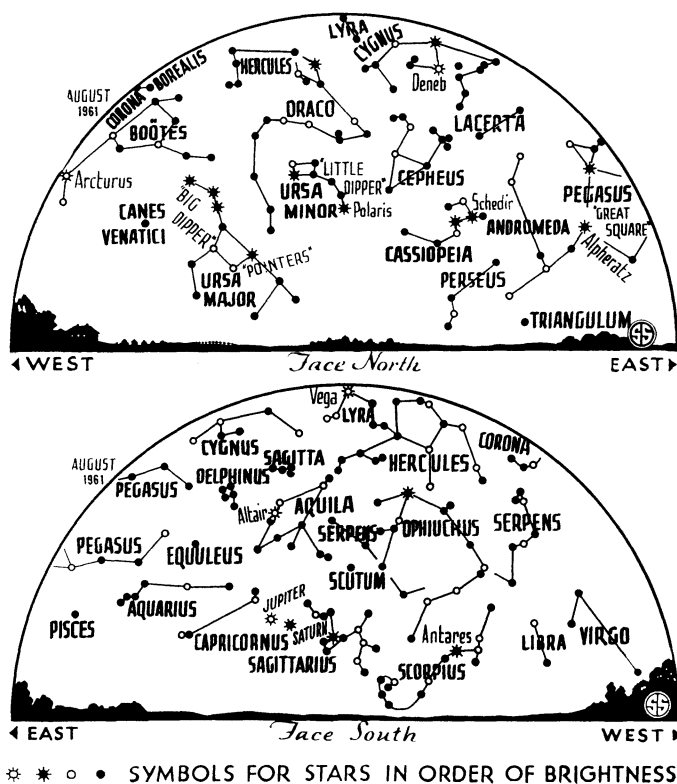
But even in the east, where the moon will be in the sky, nothing will be seen until later when the eastern edge of the lunar disc may seem to be a little fainter than normal.

At 8:36 p.m. EST the moon starts to enter the umbra, or earth's shadow, and the eclipse really begins. Very soon afterwards there will be a noticeable dimming of the eastern edge of the disc. The darkened portion will gradually increase until the maximum eclipse at 10:09 when more than 99% of the lunar diameter will be in shadow. Then the shaded area will become smaller until at 11:42 p.m., the moon will be completely out of the umbra. As the eclipse comes to an end, the moon will have risen even on the Pacific coast, and the eclipse will be visible throughout all of North America except the northwestern tip of Alaska.

Even when immersed almost completely in the earth's shadow, the moon will still be visible, shining with a dull, coppery-red glow. This is an effect of the earth's atmosphere, which acts as a prism to bend sunlight around into the shadow. As the rays pass through the air above our heads, some of the blue light is scattered, and this is what gives the daytime sky its blue color.

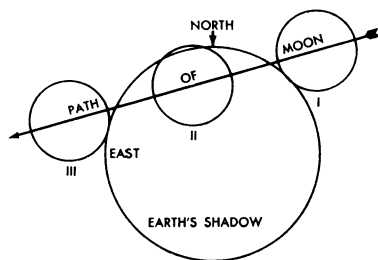
White light consists of a mixture of several colors—red, orange, yellow, green, blue and violet. With the blue and other colors at that end of the spectrum reduced, red predominates, and so the light that is bent into the shadow is much more red than ordinary sunlight.

The lunar eclipse on Aug. 25 is not the



only one for this month. Two weeks earlier, at the time of new moon, that body will come between the earth and the sun, producing a partial solar eclipse. To see it, you will have to be in southern Africa, along the coast of Brazil, in the South Atlantic or Antarctica. Over that general area, the moon will partially hide the sun. Along a belt that is mostly over the ocean there will be what is called an annular eclipse. Around the dark disc of the moon a ring of the sun's surface will be visible.

This happens because the moon will then be at about its greatest distance from the earth and its size, as we see it in the sky, will not be enough to cover the solar disc. A total eclipse of the sun occurs when the moon is closer. Then it covers the sun completely and the sun's outer envelope, the corona, flashes into view.



### Partial Eclipse of Moon Aug. 25, 1961

The large circle represents the shadow of the earth, and the small circles—I, II and III—indicate the successive positions of the moon as it passes through the shadow. The three phases shown occur at the following times (all p.m.):

|                           | EST   | CST   | MST  | PST  |
|---------------------------|-------|-------|------|------|
| I Moon starts into shadow | 8:36  | 7:36  | 6:36 | 5:36 |
| II Middle of eclipse      | 10:09 | 9:09  | 8:09 | 7:09 |
| III Moon leaves shadow    | 11:42 | 10:42 | 9:42 | 8:42 |

### Celestial Time Table for August

| Aug. | EST        |   |
|------|------------|---|
| 3    | 6:48 a.m.  | Moon in last quarter  |
| 7    | 1:00 p.m.  | Moon passes Venus   |
| 11   | 5:36 a.m.  | New moon, annular eclipse of sun  |
|      | noon       | Moon farthest, distance 252,600 miles   |
| 12   | early a.m. | Meteor shower visible, apparently radiating from constellation of Perseus in northeastern sky |
| 19   | 5:52 a.m.  | Moon in first quarter   |
| 23   | 10:00 a.m. | Moon passes Saturn  |
|      | 6:00 p.m.  | Moon passes Jupiter   |
| 25   | 2:00 p.m.  | Moon nearest, distance 222,000 miles  |
|      | 10:14 p.m. | Full moon, Lunar eclipse  |

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

### Know the Sky

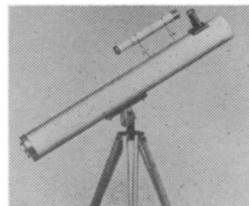
These star maps showing the positions of stars and planets can help you locate satellites when they flash briefly across the sky. Familiarity with the constellations and their relative positions makes locating artificial moons much easier whenever they are visible from your area.

• Science News Letter, 80:58 July 22, 1961

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

## AMAZING SCIENCE BUYS for FUN, STUDY or PROFIT

### 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 overcoated 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  
Send Check or M.O.—Satisfaction Guaranteed!

#### ATTENTION TEACHERS!

Elementary through college! New 96-page CATALOG of useful classroom learning and teaching aids. Science, math, physics, astronomy, biology, etc. Request **EDUCATIONAL CATALOG—Q-2**.

### NEW! THERMO-PILE KIT!



#### Converts Heat Into Electricity

For demonstration, experimentation in the exciting field of thermoelectricity. Convert the heat of a blow torch, a gas jet, or even the heat of the sun into electricity. You receive 20-14" gauge, 6" long chromel-alumel thermocouples; washer, bolt and nut for making reflector; other materials for making a thermo-pile; a small 1.5-3 V DC motor to run from thermo-pile (gives you visual demonstration of electricity created). Kit includes full directions for setting up and experimenting with thermo-piles.  
Stock No. 70,436-Q.....\$15.00 Postpaid

### NEW! EASY PAPIER MACHE MIX



Papier Mache has long been one of the most versatile modeling mediums. Ideal for modeling masks, relief maps, railroad layouts, etc. Till now, the main objection has been the mess and trouble of preparing it. This new mix ends all that. Just mix in ratio of one quart of water to one pound, knead to the consistency of dough and use. It is non-toxic, clean and odorless. Finished work can be drilled, sawed and sanded, painted or weather-proofed.  
Stock No. 70,410-Q.....5 lb. pkg.—\$2.79 Postpaid.  
Stock No. 70,411-Q.....10 lb. pkg.—\$4.30 Postpaid.

### NOW! PHOTOGRAPH MICROSCOPIC SUBJECTS WITHOUT A CAMERA



The invisible world of microscopic organisms and objects can be photographed with this kit—no camera needed. See and perfectly reproduce negative prints (black and white reversed) and all you need is a good microscope and lamp. (Our No. 70,008—Microscope is only \$14.95 and produces excellent results). Save on this quality kit, containing one 90° silvered prism, combination printing/projection screen, 4 double end clips, darkroom light, 3 plastic darkroom trays, package of 4" x 5" photo enlarging papers, chemical set and complete instructions. Order now and save!  
Stock No. 70,409-Q.....\$7.95 Postpaid



### WHIRLING WONDERS WONDERFUL WORLD OF WHIRLING WHEELS

Here's a new adventure in optical impressions—created by the magical effect of these fascinating, rotating discs. In addition to weird shapes and fantastic "after images" this kit demonstrates "stop motion" stroboscopic principles—"off center" focus and even hypnotism. Kit includes 13 discs, approx. 5" in dia. battery holder, rheostat, small motor mounted on bracket, bulb, socket, plug and complete booklet of instructions and experimental use.  
Stock No. 70,414-Q.....\$9.95 Postpaid



### SCIENCE TREASURE CHESTS

For Boys—Girls—Adults!

Science Treasure Chest—Extra-powerful magnets, polarizing filters, compass, one-way-mirror film, prism, diffraction grating, and lots of other items for hundreds of thrilling experiments, plus a Ten-Lens Kit for making telescopes, microscopes, etc. Full instructions included.  
Stock No. 70,342-Q.....\$5.00 Postpaid  
DeLuxe Chest, Stock No. 70,343-Q.....\$10.00 Postpaid

### Terrific Buy! American Model

#### OPAQUE PROJECTOR



Projects illustrations up to 3" x 3 1/2" and enlarges them to 35" x 30" if screen is 6 1/2 ft. from projector; larger pictures if screen is further away. No film or negatives needed. Projects charts, diagrams, pictures, photos, lettering in full color or black-and-white. Operates on 115 volt, A.C. current, 6-ft. extension cord and plug included. Operates on 60 watt bulb, not included. Size 12" x 8" x 4 1/2" wide. Weight 1 lb., 2 oz. Plastic case with built-in handle.  
Stock No. 70,199-Q.....\$7.95 Postpaid



### Here's a Terrific Buy! WAR SURPLUS! American-Made! 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 7 mm. Approx. field at 1,000 yds. is 376 ft. Carrying case included. American 7 x 50's normally cost \$195. Our war surplus price saves you real money.  
Stock No. 1533-Q.....only \$55.00 pstd. (tax incl.)  
6 x 30 Binoculars—similar to above and a terrific bargain  
Stock No. 963-Q.....\$33.00 Pstd. (Tax included)

### NEW BATTERY POWERED WALL CLOCK FOR OFFICE AND FACTORY



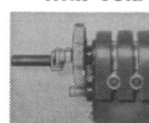
There's real savings with this battery powered wall clock that eliminates the need for wall sockets, wiring, nearness to outlets, and does away with unsightly extensions and dangling cords. The clock is all chrome, has a 12 1/2" diameter face and will run with faultless accuracy for up to three years on a single, perfect "put anywhere—use everywhere" clock for office, factory, home, shop, store, farm, camp, cabin, hotel, club, boat or plane. Price includes battery.  
Stock No. 70,435-Q.....\$25.00 Postpaid

### MINIATURE WATER PUMP



Wonderful for experiments, miniature waterfalls, fountains, HO gage railroad backdrops, etc. Tiny (2 1/2" x 1 1/2") 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 hrs. on battery. Works in either direction. Self priming.  
Stock No. 50,345-Q.....\$2.25 Postpaid

### WAR SURPLUS ELECTRIC GENERATOR



Brand-new Signal Corps Generator for endless experiments, electrical use, demonstrations. Generates up to 90 volts by turning crank. Use in high impedance relays. Ring bells. Or charge ground and bring up night crawlers for fishing bait. Has 2 Alnico Magnets. Wt. 2 lbs. Cost to Government \$15.00.  
Stock No. 50-225-Q.....\$4.95 Postpaid



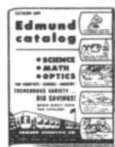
### OFFSPRING OF SCIENCE... REALLY BEAUTIFUL CIRCULAR DIFFRACTION —RATING JEWELRY

Shimmering rainbows of gemlike color in jewelry of exquisite beauty; made with CIRCULAR DIFFRACTION... GRATING REPLICA. Just as a prism breaks up light into its full range of individual colors, so does the diffraction grating. Promises to become a rage in current fashion. 1" diameter.  
Stock #30,349-Q Earrings.....\$2.75 Pstd.  
Stock #30,350-Q Cuff Links.....\$2.75 Pstd.  
Stock #30,372-Q Pendant.....\$2.75 Pstd.  
Stock #30,390-Q Tie-Clasp.....\$2.75 Pstd.

### FREE CATALOG-Q

144 Pages! Over 1000 Bargains!

America's No. 1 source of supply for science experimenters, hobbyists. Complete line of Astronomical Telescope parts and assembled Telescopes. Also huge selection of lenses, prisms, war surplus optical instruments, parts and accessories—Telescopes, microscopes, satellite scopes, binoculars, infra-red sniper-scopes... items for making "Science Fair" projects, math learning and teaching aids.  
Request Catalog-Q



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

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