



ASTRONOMY

Spring Reflected in Skies

Jupiter, shining in Taurus, is still the most prominent figure in the western sky, while characteristic springtime groups such as Leo appear in the south.

By JAMES STOKLEY

► REFLECTING the changing cycle of the seasons, the evening skies now show us that spring is here. Many of the familiar stars and constellations of winter have gone from view and there are even glimpses of summer's offerings.

Jupiter is still the most prominent of all stars or planets, shining in the west in the constellation of Taurus, the bull. Its position is shown on the accompanying maps. These depict the sky as it appears about 10:00 p.m., your own kind of standard time, on April 1. The sky looks the same at 9:00 p.m. in mid-April and at 8:00 p.m. as the month ends. Earlier in the evening the stars shown in the west are higher and farther south.

Taurus Prominent

Taurus is one of the prominent winter constellations; so is its neighbor to the left, Orion, the warrior. Aldebaran is the bright star in Taurus, while Betelgeuse shines brilliantly in Orion. Farther left stands Canis Major, the great dog, with the star called Sirius. Above Canis Major is the lesser dog, Canis Minor, with Procyon. Still higher (shown partly on the southern map, partly on the northern) is Gemini, the twins.

In the south the most characteristic springtime groups appear. Probably the most easily recognized is Leo, the lion. The brightest star is Regulus, which marks the end of the handle of the subgroup called the Sickle. Farther left Denebola, a star of the second magnitude, marks the lion's tail.

Virgo, the virgin, stands to the left of Leo and lower, with Spica its brightest star. This constellation is part of the Zodiac, which also includes Tau-

rus, Gemini, faint Cancer (the crab), Leo and Libra (the scales) only partly visible low in the southeast.

Just above the eastern end of Virgo is Bootes, the herdsman, with Arcturus. This constellation is also divided between our two maps. Just above the part of it shown in the northern sky is the Big Dipper, the best known of all star figures. Actually it is part of Ursa Major, the great bear. Below, in a direction indicated by the pointers in the bowl of the dipper is Polaris, the pole star, which marks the north. Polaris is a star in the Little Dipper, which is part of Ursa Minor, the little bear.

Just above the northeastern horizon, is the first magnitude star Vega, in Lyra, the lyre. On the map Vega is shown as a fourth magnitude star because it is so low, where the earth's atmosphere absorbs much of its light. On summer evenings, when Vega is overhead, it will be the brightest star visible.

The stars of Leo, so prominent in the south on April evenings, may bear little resemblance to a lion. However, it is easier to imagine the figure of a lion around these stars than, for example, the figure of a crab around the stars of Cancer.

On the star maps published in the 17th century, which depicted various figures around the stars, the blade of the Sickle formed the lion's head. Regulus was in his heart, and the star just to the right was in one of the paws. The stellar triangle, in the left-hand part of the group, formed his hind-quarters, with Denebola as the tail and the two fainter stars below as parts of a hind leg.

The name Denebola means "the lion's tail." It is derived, like many other star names, from the Arabic words "Al Dhanab al Asad." In that language, "Dhanab" means "tail." In

the constellation of Cygnus, the swan, which is visible on autumn evenings, there is a star called Deneb. This has the same origin, since it marks the bird's tail.

As shown in the ancient star maps mentioned above, the lion's tail used to be imagined as curled at the tip. However, before the second century B.C., so an old story goes, it extended out to the left, to the constellation we know today as Coma Berenices, the hair of Berenice. This is a loose cluster of distant stars, which does have a hair-like appearance.

Queen of Egypt

Berenice was a queen of Egypt about 243 B.C., the wife, and also the sister, of the third Ptolemy, known as Euergetes. She had lovely blonde hair, which she cut off and placed in a temple to show her gratitude to the gods for bringing her husband safely home from war.

But then someone stole the tresses from the altar. Conon, the court astrologer, consoled the royal couple by pointing to the star cluster of Coma. He explained that the gods had been so pleased with the queen's sacrifice that they had placed her hair in the sky.

The constellation of Leo was important to the Egyptians because, in the spring when the sun moved in front of Leo, the Nile overflowed its banks and irrigated their lands, according to Pliny. It has also been said, probably fancifully, that this constellation was called a lion because at that time of year the lions left their usual haunts for the banks of the Nile, to get relief from the heat.

Seen through a telescope, Denebola appears as two stars—one blue, the other orange. Actually, however, they are not close together and, therefore, not a true binary. The two stars just happen to be in nearly the same direction from us. Such a configuration is called an optical double.

The star in the Sickle marked by a small "g" also appears as two when seen through a telescope. One is orange, the other greenish yellow. This is called gamma Leonis, and is a true binary star. Its two components really are rather close, and they revolve around the center of gravity between them. Of the numerous double stars in the sky, this pair is generally considered one of the finest.

Celestial Timetable for April

APRIL	EST	
3	2:00 p.m.	Moon nearest, distance 224,300 miles
5	6:14 a.m.	Full moon
6	8:00 a.m.	Venus farthest west of sun
12	12:29 p.m.	Moon in last quarter
15	1:00 p.m.	Moon farthest, distance 251,800 miles
16	8:00 a.m.	Moon passes south of Venus
17	3:00 p.m.	Moon passes south of Saturn
18	4:00 a.m.	Moon passes south of Mercury
	6:00 a.m.	Mercury farthest west of sun
20	3:36 p.m.	New moon
	EDST	
25	4:00 a.m.	Moon passes north of Jupiter
27	11:50 p.m.	Moon in first quarter
29	1:00 a.m.	Mars behind sun

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

• Science News, 89:202 March 26, 1966

ASTRONOMY

Ionized Particles Can Polish Mirrors

► **THE ACCIDENTAL** discovery that a beam of charged particles can be used to polish telescope mirrors holds promise of the possibility of making surfaces of mirrors flat to a higher accuracy than obtained by other methods.

The more highly polished, or flat, a mirror is, the clearer the photographs taken with a telescope, other factors being equal.

The discovery of what is termed "ionic polishing" was made by Drs. A. B. Meinel and S. Bashkin of the University of Arizona, Tucson, and Dr. A. Loomis of Kitt Peak National Observatory, also in Tucson.

It happened this way: The new atomic accelerator at the University of Arizona was being tested. A beam of ionized particles was supposed to be focused on the rough side of a piece of fused silica, in order to check on the beam size.

By mistake, the good side was used. When this was discovered, examination showed that this ion-bombarded surface had a polish at least as good and probably better than before it had inadvertently been exposed to the beam.

The surface was surprisingly uniform, the scientists found. They estimate roughly that each ion removed one atom of the target.

• Science News, 89:203 March 26, 1966

GET READY FOR THE SPACE and SCIENCE ERA! SEE SATELLITES, MOON ROCKETS CLOSE-UP!
AMAZING SCIENCE BUYS
for FUN, STUDY or PROFIT

EXPLORE THE WORLD OF "OP ART"
Fascinating New Experimenters' MOIRE PATTERNS KIT
Fantastic Visual Effects!
Limitless Applications

Now! Experiment with the amazing new tool of tomorrow. Basis of "OP ART"—latest rage sweeping the country in art, fashion, packaging industries. 1,000's of uses for hobbyists, photographers, designers, lab and home experimenters. Fun! Profitable! Unlimited potential. Here's your complete introduction kit developed by Dr. Gerald Oster, Brooklyn Poly. Inst. Contains 8 basic patterns on both clear acetate lantern slide size 3 1/4" x 4" (.020 thick) and .012" thick white Krome-kote paper 3 3/4" x 4 1/2" (coated one side); two piece 3 1/4" x 4" 150-dot screen on film, copy Dr. Oster's book, "The Science of Moire Patterns", an authoritative introduction to the fascinating world of moire.
Stock No. 70,719-Q (KIT "A").....\$8.50 Ppd.
Stock No. 60,464-Q (without book).....\$6.50 Ppd.

NOW AVAILABLE IN FULL COLOR
 Wait 'til you see the fantastic rainbow of color—all 8 patterns above in full transparent colors: red, yellow and blue, plus black (total 40). Compl. instructions.
Stock No. 60,530-Q (Kit A).....\$12.50 Ppd.

NEW DE LUXE EXPERIMENTERS' MOIRE KIT "B"
 Eight new totally different black and white patterns: Coarse sines; 65-line sines; perspective squares; medium grating; Gaussian grating; converging circles, elliptical zone plate; 30-line logarithmic spiral; plus instructions by Dr. Oster.
Stock No. 70,790-Q.....\$6.00 Ppd.

NEW MOIRE KIT "B" IN COLOR
 8 new patterns above in red, yellow and blue; plus black (total 40) with inst. by Dr. Oster.
Stock No. 60,531-Q.....\$12.50 Ppd.

NEW JUMBO 20" x 25" MOIRE PATTERNS
 Excellent for displays and signs. Write for details.
MOIRE PATTERN ACCESSORY KIT. For additional experiments. Incl. metallic balloon, caelite, two kinds of diffracting gratings, one-way mirror film polarizing materials. Ronchi rulings, assortment of lenses.
Stock No. 60,467-Q.....\$8.00 Ppd.

SPECIAL AMERICAN MADE! OPAQUE PROJECTOR
 Insert illustrations up to 3" x 3 1/4" to project and enlarge them to 35" x 30" if screen is 6 1/2 ft. from projector. No film or negatives needed. Projects magazine pictures, photos, lettering in full color or black-and-white. Use in darkened room for best results. Operates on 115-volt A.C. current. 6-ft. extension cord and plug included. Operates on 60 watt bulb, not included. Approved by Underwriter's Laboratories, Inc. Size 12" x 8" x 4 1/2". Weight 1 lb. 2 oz. Plastic case with built-in handle.
Stock No. 70,199-Q.....\$7.95 Postpaid

"Balls of Fun" for Kids . . . Traffic Stoppers for Stores . . . Terrific for Amateur Meteorologists
SURPLUS GIANT WEATHER BALLOONS
 At last . . . available again in big 8-ft. diameter. Create a neighborhood sensation. Great backyard fun. Exciting beach attraction. Blow up with vacuum cleaners or auto air hose. Sturdy enough for hard play; all other uses. Filled with helium (available locally) use balloons high in the sky to attract crowds, advertise store sales, announce fair openings, etc. Amateur meteorologists use balloons to measure cloud heights, wind speed, temperature, pressure, humidity at various heights. Photographers can utilize for low-cost aerial photos. Recent Gov't surplus of heavy, black, neoprene rubber.
Stock No. 60,568-Q.....\$2.00 Ppd.
SLIGHTLY HEAVIER RUBBER—LATER MANUFACTURE!
Stock No. 60,562-Q—4 ft. diam. size.....\$2.00 Ppd.
Stock No. 60,564-Q—8 ft. diam. size.....\$4.00 Ppd.

Revolutionary Technological Breakthrough in LIVING UNDER WATER
Underwater Ant Nest Used to Dramatize Development
 Sensational new development may be forerunner to underwater cities, the day man will live under the sea. Silicone Rubber Membrane enables ants (and other creatures) to live and breathe normally by obtaining life giving oxygen from water even though ant nest is submerged and sealed off completely from atmosphere. When ants consume oxygen in nest, pressure decreases below that of oxygen pressure in the water—allowing oxygen from water (but not water) to pass through membrane. When carbon dioxide pressure increases inside nest it passes out through membrane. 3" x 5" membrane (.001" thickness) is bonded to dacron mat for mechanical strength and made exclusively, by hand craftsmen, for Edmund Scientific's experimental customers. Nest comes complete with sand, food, certificate to be returned for supply of ants. Complete instructions. Supply limited. Use your aquarium or order ours, listed below.
Stock No. 70,901-Q (Ant nest, membrane, instr.).....\$6.75 Ppd.
2 1/2 GALLON PLASTIC AQUARIUM
Stock No. 90,014-Q.....\$7.95 Ppd.

ORDER BY STOCK NUMBER - OPEN ACCT. TO RATED FIRMS - SATISFACTION GUARANTEED!
EDMUND SCIENTIFIC CO., BARRINGTON, NEW JERSEY 08007

Solve Problems! Tell Fortunes! Play Games!
NEW WORKING MODEL DIGITAL COMPUTER

Actual Miniature Version of Giant Electronic Brains
 Fascinating new see-through model computer actually solves problems, teaches computer fundamentals. Adds, subtracts, multiplies, shifts, complements, carries, memorizes, counts, compares, sequences. Attractively colored rigid plastic parts easily assembled. 12" x 3 1/2" x 4 3/4". Incl. step-by-step assembly diagrams, 32-page instruction book covering operation, computer language (binary system) programming, problems and 15 experiments.
Stock No. 70,683-Q.....\$9.98 Ppd.

Pistol Grip! Tripod! Window Mount! Wrist Strap!
NEW SMALL BUT POWERFUL 10X TELESCOPE

Has Everything You Need!
 Beautiful little instrument, 5" lg., fits hand perfectly, weighs only 7 1/2 oz. Big objective lens—full 30mm diam.; prismatic; bright, right-side-up image. Perfect for vacationers, nature lovers, sportsmen, birdwatchers, etc. So compact, will fit in your pocket, ladies handbag, glove compartment, brief case, tackle box, etc. You're never without a rigid support—includes (1) 8" tripod (extends to 10", has rubber feet) with tilting-panning head; (2) pistol grip; (3) screw-in-wrist strap; (4) rubber padded car window mount. Threaded eyepiece for fast, smooth focusing from 20 ft. to infinity. 215-ft. field of view over 1000 yards. Coated objective and eyepiece. Fine, enameled metal body, tan finish. 5 1/2" x 2" x 2" zippered, simulated leather case.
Stock No. 70,775-Q.....\$26.95 Ppd.

Exciting New Teaching Aid . . . FLEXIBLE MAGNETIC CORD

"SKETCHES" COUNTLESS SHAPES AND FIGURES
 Now demonstrate math equations, produce instantly changeable graphs and charts, improve quality of elementary art! 3/32" diam. flexible magnetic cord clings firmly in exact shapes formed to metal sheets, metal bulletin boards, metal desks. Wonderful teaching aid in both primary and advanced classes. Can be used to plot large, easy-to-read graphs and charts, demonstrate math equations—maxima and minima points on an equation line. Instantly changing equation lines, produce every type of curved shape. Usable by youngsters for "sketching" simple art forms, writing names, blind students as creative aid in forming identifiable shapes. (Write for Catalog 661-Q to get details on other magnetic items—bulletin boards, toys, teaching games, horseshoes, bars, discs, cylinders, sheets and tape.)
Stock No. 40,873-Q—10 feet.....\$2.50 Ppd.
Stock No. 40,876-Q—25 feet.....\$6.00 Ppd.

Explore the Fascinating World of Magnetism Handy! Low Cost!

PREDICT AND ILLUSTRATE OVER 30,000 CHEMICAL REACTIONS
 New Chemical Predictor excellent for teachers and students. Two charts of equations so arranged that any combination can be instantly selected—furnish detailed equation for the chemical reaction. Numerical data shows whether a reaction can occur, and if so, the extent and products of it. Manila-paper stock, 5 1/2" x 11".
Stock No. 40,752-Q.....85¢ Ppd.

'FISH' WITH A WAR SURPLUS 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, lake, river 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. Govt. cost \$50. Lifts over 150 lbs. on land—much greater weights under water.
Stock No. 70,571-Q—5lb. Magnet.....\$12.50 Ppd.
Stock No. 70,570-Q—3 1/2-lb. size.....\$8.75 Ppd.
Stock No. 85,152-Q—15 1/4-lb. size lifts 350 lbs. \$39.60 FOB

Order by Stock No.—Send Check or M.O. Shipment same day received—Satisfaction or money back.
TEACHERS: Write for Educational Catalog Q-2 Edmund Scientific Co., Barrington, N.J.

MAIL COUPON for FREE CATALOG "Q"

EDMUND SCIENTIFIC CO.
 Barrington, New Jersey 08007
 Completely new 1966 Edition, 148 pages. Really 1000 BARGAINS. Please Rush Free Catalog "Q"

Name.....
 Address.....
 City.....State.....Zip.....

