ASTRONOMY

Mars Still Getting Brighter

By end of April, Mars will have doubled in brightness to be about equal to Sirius. Brilliance and red color make it easy to locate in the southeast sky.

By JAMES STOKLEY

➤ MOST STRIKING astronomical event on the program for April will be the way the planet Mars brightens as it comes near the earth, in preparation for its closest approach in May.

The location of Mars is shown on the accompanying maps. These give the positions of the heavenly bodies at about ten o'clock on the first of April, nine o'clock at the middle of the month and eight o'clock at the end.

Mars, in the constellation of Libra, the scales, shown low in the southeast, is moving in the direction of the next-door group of Virgo, the virgin.

At the beginning of April, Mars is of magnitude minus 0.8. This is brighter than any star with the exception of Sirius, seen in the southwest. By the end of the month it will practically double in brightness, and will then about equal Sirius. Its brilliance and red color make Mars easy to locate.

Saturn Also Visible

Another planet can also be seen a little higher, in Virgo. This is Saturn. Though much fainter than Mars, it is considerably brighter than Spica, the brightest star in that constellation.

Next to Virgo, to the right, standing high in the southern sky, is the figure of Leo, the lion, with the smaller group known as the "sickle" and the star Regulus marking the end of the handle of that implement.

High in the east we find Bootes, the bear-driver, with the bright star Arcturus. A good way to locate this orb is first to look to the northeast for the familiar Great Dipper, which is now upside down. At the left are the well-known "pointers," whose direction, followed downward, shows the location of Polaris, the pole star.

If the curve of the dipper's handle is followed toward the right, the first bright star one comes to is Arcturus. Considerably below Bootes and close to the northeastern horizon is Vega, in Lyra, the lyre, not very conspicuous at present, but on summer evenings it is the brightest star visible.

Toward the west, making their last appearance before disappearing from the evening skies until next autumn, are the stars of Orion and his neighbors. Already, as shown on the maps, the lower part of Orion has set, though bright Betelgeuse can still be seen. To the left is Sirius, in Canis Major, the great dog, and above it we find Canis Minor, the lesser dog, with Procyon.

Highest of these constellations is Gemini, the twins, shown partly on the northern map and partly on the southern. In it are the stars Castor and Pollux, the latter being brighter.

A little below this figure, toward the northwestern horizon, stands Auriga, the charioteer, with Capella, and below him is Taurus, the bull, with Aldebaran. Though a star of the first magnitude, it is, like Vega, made to appear dimmer because it is so low and more of its light is absorbed by passage through the earth's atmosphere than when it is high overhead.

Hydra at Its Best

Seen at its best in April, even though it contains no stars of the first magnitude, is Hydra, the water-snake, which extends in a long, zig-zag line of stars across the southern sky. The head is formed by the quadrilateral just below Cancer, the crab, which in turn is between Regulus and Pollux. The third star in the serpent's body, Alphard, which is of the second magnitude and red in color, is supposed to represent the reptile's heart.

As the earth and the other planets revolve about the sun, most of them follow orbits that are nearly circular. Since they have different periods for their times of revolution, we see the others, from the earth, in different directions. Sometimes one is seen in the same direction as the sun, and then it is said to be in conjunction with that body.

Or, again, a planet farther from the sun than earth may be seen in the opposite direction from the sun, and this is called opposition. Then, of course, the distance of the planet from the earth is equal to the difference between its distance from the sun and our distance from the sun. Thus it is closest to us when near opposition.

If the orbits were truly circular, the closest approach would come exactly at this position. As it is, they are somewhat stretched out into ellipses, and the time of least distance may come a little before or after opposition.

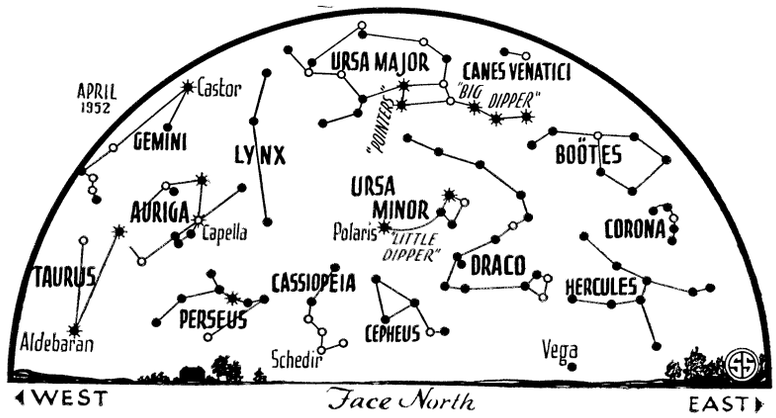
During this month of April we have the unusual experience of three planets in opposition, though only two, Mars and Saturn, are visible to the naked eye. The third is Neptune, which may be seen only with the aid of a telescope. Its opposition with the sun comes on April 10, when it is only 2,722,000,000 miles away! Saturn's opposition comes on the first day of April, with a distance of 798,900 miles.

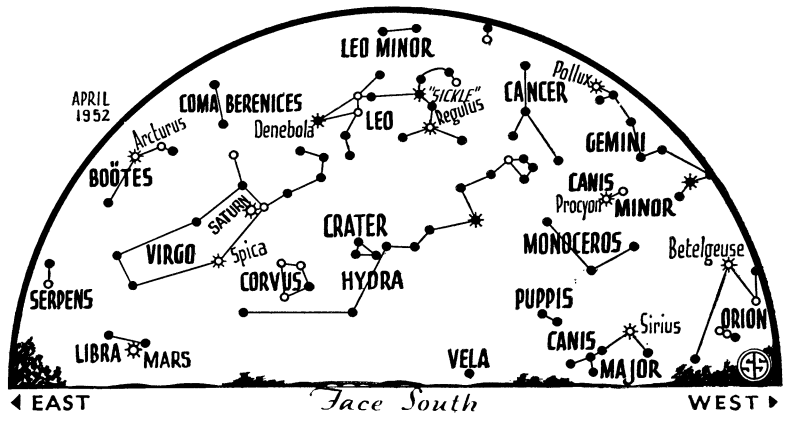
Mars comes considerably closer, with opposition on the last day of the month. Then it will be 52,360,000 miles from us, about 11,560,000 miles closer than it is on April 1, a fact which well explains its twofold increase in brightness during April.

Its nearest approach to earth, however, will not come until May 8, when it moves in to 51,860,000 miles. This, however, will not be enough to make any great difference in brightness. About April 25 it reaches its maximum in brilliance, magnitude minus 1.5, and remains at this until about May 13, when it will start to dim again as it recedes from our part of the solar system.

Two other naked-eye planets are in conjunction in April and hence invisible because they rise and set with the sun, and are above the horizon principally during daytime hours.

Because Mercury moves in an orbit smaller than ours, it can never get into opposition, but it has two kinds of conjunction. One, which it reaches on April 5,





☼ ✱ ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

is "inferior conjunction," when it is between us and the sun. The other kind, when Mercury is on the far side of the sun, is "superior conjunction," which occurs on June 8.

Jupiter, which shone so brilliantly in the evening sky during the past winter, reaches conjunction on April 17. By the end of May it will have moved sufficiently far to the west of the sun to enable it to rise in the east about an hour before sunrise, and so begin to be visible at dawn as a morning star.

Though Venus does not reach superior conjunction until June 24, it is already nearly in the sun's direction and far beyond that body. At the beginning of April it rises less than an hour before sunrise, after the morning twilight has well begun.

Venus is still so low, when the sun appears, that it is hardly possible to see it. Not until next autumn will Venus have moved sufficiently far to the east of the sun to permit us to view it as an evening star low in the west.

Celestial Time Table for April

April	EST	
1	5:00 a. m.	Saturn opposite sun, distance 798,900,000 miles
2	3:48 a. m.	Moon is in first quarter
3	1:00 p. m.	Moon farthest, distance 251,300 miles
5	5:00 a. m.	Mercury between earth and sun
9	3:26 p. m.	Moon passes Saturn
10	2:00 a. m.	Neptune nearest, distance 2,722,000,000 miles
	3:53 a. m.	Full moon
12	5:48 a. m.	Moon passes Mars
17	2:00 a. m.	Jupiter beyond sun
	4:07 a. m.	Moon in last quarter
18	3:00 a. m.	Moon nearest, distance 229,800 miles
21	early a. m.	Meteors visible radiating from constellation of Lyra
24	2:27 a. m.	New moon
30	8:00 p. m.	Mars opposite sun, distance 52,360,000 miles

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

Science News Letter, March 29, 1952

ELECTRONICS

Printed "Wires" for TV

➤ PRINTED CIRCUITS for television receivers should save critical materials and reduce labor costs, W. H. Hannahs and Norman Stein of the Sylvania Electric Products Inc., have reported to the Institute of Radio Engineers in New York.

A new production technique divides television circuits into about 20 sub-assemblies, each having an electron tube and associated components.

Each unit is printed on two small cards, one being made of a ceramic material and the other made of a plastic. Electrical contacts between connecting circuit sub-assemblies is made by dipping the cards in molten solder and then joining them.

Printed circuits have been a reality ever since the proximity fuze was developed during World War II, although the principle has been known and thought practical since the early 1900's. Today they are being used commercially in some amplifiers, transmitters, receivers and hearing aids.

Basically, a circuit is printed on a ceramic or plastic plate using a metallic "ink." Circuits have been sprayed on, painted on, etched on, die-stamped on, dusted on, chemically deposited and applied through a vacuum process.

Printed television circuits are expected to reduce a television set's 500 hand-soldered connections by as much as 60%.

Already some printed circuits are being used in television sets. But though the circuits can be produced quickly, costs of materials needed to print the circuits will keep prices about the same as competitive sets not using printed circuits. Their performance is at least equal to commercial circuits.

Science News Letter, March 29, 1952

OPTICS

Reverse Sunglasses Aid Pilots Flying at Night

➤ REVERSE SUNGLASSES will help combat-wise World War II veteran pilots at the controls of night bombers and fighter planes in Korea.

They were designed, by Lt. Wayne E. Gulley of the Air Force School of Aviation Medicine, Randolph Field, Tex., for the pilot with a slight defect of vision that can be corrected by eye glasses.

Just as corrective lenses can be tinted to give protection against the sun, the lenses of these glasses are treated to cut down the loss of light by reflection that is bothersome to a person wearing glasses at night.

The treatment consists in coating the lenses with magnesium fluoride, a substance used on costly camera lenses to cut down loss of light by reflection. To avoid the trouble with light glinting from behind on a small lens, these special night lenses are fitted into the standard Air Force sunglass frames that cover the pilot's whole range of vision.

One drawback to the new glasses is that the soft metallic coating begins to wear off in irregular patches after a few months of normal use. Then the glasses must be cleaned and recoated. Further research may develop a way to harden the coating and do away with this inconvenience.

Science News Letter, March 29, 1952