ASTRONOMY

Three Planets Decorate Evening Sky

Mercury, on Brief Visit, Joins Mars and Jupiter; Spring Begins at 8:43 p. m., March 20

By JAMES STOKLEY

THE PLANETS Mars and Jupiter have now risen higher in the east. Last month they made their return to the evening sky after a period in which no planets were to be seen during the night until after midnight. They are conspicuous now in the early evening, and can be seen through the entire night. In fact, this month they are brighter than they have been for some time, because during March both bodies make their closest approach to the earth in this trip around the sun.

As you look to the east about nine o'clock you will see the sickle of Leo, the lion, high in the sky, with the bright star Regulus at the end of the handle, which points to the southeastern horizon. Just below the sickle is a bright red body. This is Mars. Directly below Mars is an even brighter object, Jupiter. Both planets shine with a steady glow that easily distinguishes them from the nearby stars, which they exceed in brilliance.

At Opposition March 1

On March 1 Mars was at opposition, that is, it was in the part of the sky directly opposite the sun, rising in the east just as the sun was setting in the west. Therefore it was visible all through the night. Shortly after this date, on the third, it was closest to the earth—only 62,717,000 miles away.

The "year" of Mars, that is, the time it takes to make a complete circuit in its orbit around the sun, is 687 days as compared with 365 for the earth. Both planets are moving around the sun in the same direction, so when Mars has returned to the same direction from the sun, the earth, with its more rapid motion, has passed this point nearly a year before. Mars keeps on going, and after 780 days the earth catches up with Mars and the two planets are again close together and in the same direction from the sun.

Were their orbits perfectly circular, the distance at such a time of opposition would always be the same. But both orbits are elliptical, and sometimes, as in 1924, Mars happens to be in opposition when it is at the part of its orbit that comes nearest to that of the earth. Then the two bodies were only 34,500,000 miles apart. The part of the earth's orbit closest to that of Mars is the place that our planet occupies in August, and hence this close approach always occurs in that month.

At other times of opposition, the two planets are considerably farther apart. The greatest distance that can separate them when at opposition is 62,900,000 miles, so this year's is almost as bad as it can be.

Studying Mars Now

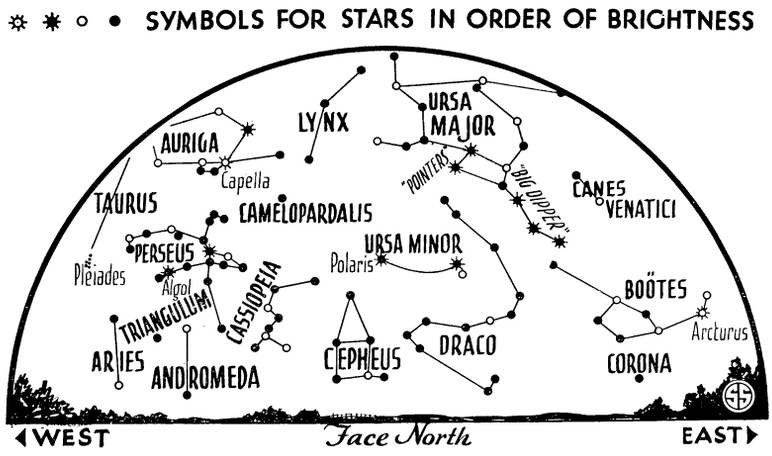
But there is another consideration, and that is that in August the sun is always far north in the sky. Because opposition means that the planet is directly opposite, Mars, at an August opposition, is towards the southern part of the sky, and, this in turn means, for astronomers in the northern hemisphere, that it does not rise very high above the horizon. Its light must penetrate a greater thickness of the earth's atmosphere and so can not be observed as well as if it were higher. At a winter opposition, on the other hand, the conditions are reversed. The sun is low and the planet is high—about 25 degrees higher than when the phenomenon occurs in August. For northern astronomers this greater altitude in the sky compensates to some extent for the greater distance, and Mars is now being studied carefully at a number of observatories where special interest is taken in the planets.

Jupiter is much farther away. It takes 11.862 years to make one of its trips around the sun, and the earth catches up to it every 399 days. Its orbit is much more nearly circular than that of Mars, so its relative distance at opposition varies much less. Its average distance at such a time is 390,000,000 miles, at best it is 367,000,000 miles, but when at opposition on the ninth of this month it will be about 412,000,000 miles away.

At this time it is of the minus two magnitude, a full unit of brightness more brilliant than Mars, which is of the minus one magnitude. This means that the more distant planet is about two and a half times as bright as the nearer one, a paradox that is explained by the greater size of Jupiter—88,000 miles in diameter as compared with 4,100 miles for Mars—which enables it to reflect a much greater amount of sunlight. These two bodies, of course, like all the planets, have no light of their own, but shine by reflected sunlight.

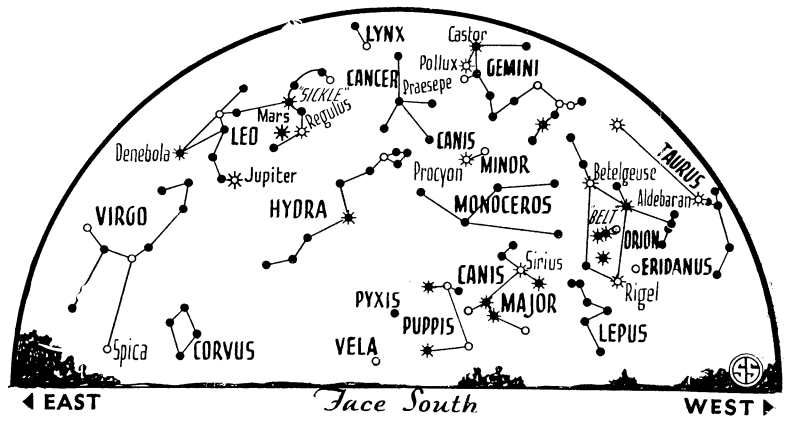
Shy Mercury

Besides these two planets which are seen all through the night and throughout the entire month, there is a third which makes a brief appearance in the western sky around the sixth. This shy little body is Mercury, innermost planet. It can never come to opposition, and is



NEAREST BUT MOST DISTANT

On March 3, Mars will be 62,717,000 miles from the earth, the nearest approach of current cycle. This distance, however, happens to be practically the greatest that can separate the two planets at such a time of close approach.



READY TO VANISH

The brilliant stars Sirius, Betelgeuse, Rigel and Aldebaran are approaching the horizon behind which they will disappear until next winter.

always seen close to the sun. Sometimes it is west of the sun and appears in the eastern sky just at daybreak. At other times, as now, it is at the position called "greatest eastern elongation," and remains in the western sky a short time after the sun has set. On the sixth, Mercury will be of the minus two magnitude or as bright as Jupiter. But since it can be seen only in the twilight, it will not be nearly so easy to find.

On this date, or a day or two before or after, scrutinize the western horizon as soon as possible after the sun has descended below it. Then, perhaps you will be rewarded by seeing in the gathering dusk this planet which even the great Copernicus is said never to have viewed.

The other planet of the month is to be seen in the morning sky. Saturn rises between four and five a. m., and can be seen before sunrise, low in the southeast. Venus is not visible at all this month, because of its proximity to the sun. During the late spring and summer it will reappear as a conspicuous object in the western evening sky.

Planets in Leo

The stars of the evening sky are now assuming a vernal aspect. Orion with its two brilliant stars, Betelgeuse and Rigel, Taurus, the bull, with Aldebaran, and Sirius in Canis Major, the great dog, are in the southwest, approaching the horizon behind which they will soon vanish until next winter. Procyon, the lesser dog star, in Canis Minor, shines higher in the southwest above Sirius. Still higher and more directly west is Pollux, the more brilliant of the twins, Gemini. A little lower and more to the north is Capella, the first magnitude star in Auriga, the charioteer. In the eastern sky, Leo, the lion, has risen high. Its position with Regulus and the sickle was referred to previously.

Mars and Jupiter are in this constellation shining brighter than any of the nearby stars. Below them is Virgo, the virgin, with Spica as its most brilliant star. The brightness of Spica is somewhat diminished, however, by reason of its low altitude in the evening sky at present. A tenth first magnitude star is visible to the northeast. It is Arcturus in Bootes, the herdsman.

During March, the moon passes through its phases as follows: On the fourth it is at first quarter, on the 11th full, on the 18th at last quarter, and new on the 25th. Thus the evenings from the beginning of the month to about the 15th will be moonlit.

On the 20th the sun performs a welcome phenomenon, though at the time nothing is visible to indicate the occurrence. On that date, at 8:43 p. m. eastern standard time, the sun crosses the equator as it moves northwards in the sky. This is called the vernal equinox, as the length of night and day is then the same. Spring begins at that moment.

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CHEMISTRY

Depression Flower Gardens Are Not New Inventions

THE DEPRESSION flower gardens, that grow from chemicals and not from seeds, are not new inventions. An engineer, Tenney L. Davis, writing in Massachusetts Institute of Technology's *Technology Review,* has traced their history back to 1705 when the French chemist, Nicholas Lemery, told the French Academy how to make "vegetations" by the spontaneous evaporation of salt solutions.

Lemery used salts of iron and wrongly concluded from his experiments that iron is therefore necessary for the growth of plants. Since ammonia is used in making the 1933 model of depression garden, Tenney L. Davis remarks that it might lead to the wrong inference of a correct judgment that ammonia is essential to the growth of nearly every kind of vegetable organism.

The formula for a successful chemical flower garden is: six tablespoonfuls of salt, six tablespoonfuls of bluing, six tablespoonfuls of water and one tablespoonful of ammonia water. Mix thoroughly and pour over a clinker placed in a suitable dish. A piece of coke, common brick or a mass of coal ashes can be used instead of a clinker. Not all the salt will be dissolved but pour it out with the rest. Then drop on the clinker a few drops of mercurochrome solution, red or green ink, or other colored liquid that may be handy. But do not use iodine because it will react with the ammonia to form nitrogen iodide, which is a black powder that when dry becomes a dangerous explosive detonated by a slight shock. In a quarter of an hour the coral-like growth begins.

Another type of chemical garden is made by dropping the readily soluble salt crystals of certain metals into a jar of sodium silicate solution or "water glass." By osmosis, growths resembling marine plants spring up from the crystals and climb rapidly upward through the liquid. For brown, use ferric chloride; for grass green, nickel nitrate; for emerald green, cupric chloride; for yellow, uranium nitrate; for dark blue, cobaltous chloride or nitrate; for white, manganous nitrate or zinc sulphate.

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