

ASPECTS OF THE PLANETS FOR SEPTEMBER.

VENUS

is evening star, and retains her ascendancy throughout the month as brightest of the starry throng. A careful observer will readily notice her increasing size, her diameter now nearly measuring twenty seconds, while at the end of the month it will measure twenty-six seconds. It must, however, be remembered that the more her diameter increases and the more nearly she approaches the earth, the less of her enlightened disk is turned toward us. If when, in December, she passes between us and the sun, her enlightened disk were turned towards us, she would indeed be an object glorious to behold.

The progress of Venus in September is made specially interesting by the occurrence of an important epoch in her course. On the 27th, at two o'clock in the morning, she reaches her greatest eastern elongation, or most distant point from the sun on his eastern side. Those who have taken note of her steps since her superior conjunction with the sun on the 20th of February, when she commenced her role as evening star, saw her about two months later as a faint star close to the sun for a short time after sunset. For seven months she has been traveling farther from the sun, setting later every night, and growing more brilliantly beautiful. She will, on the 27th, reach the end of the invisible chain that binds her to the sun; the golden bead strung on the celestial wire has reached the limit of its length.

Not a second farther she can swerve. The resistless attraction of the great luminary turns her course and directs her retrograde steps westward, until, in our view, she has retraced the eastward course, and arrived at her inferior conjunction and transit. Millions of observers are watching her receding steps with eager interest, for the goal toward which she hastens ushers in the great astronomical event of the year.

Venus at elongation is $46^{\circ} 36'$ east of the sun. As 15° represents one hour of time, and it is possible for her to move farther from the sun than an average distance of 45° , it will be seen that she can never be visible much more than three hours after sunset. As the same laws prevail in reversed order when she is morning star, for the same reasons, she can never be seen more than three hours before sunrise.

The increased velocity of the planet's motion after elongation is also to be noticed. While she has been nearly seven months in passing from superior conjunction to eastern elongation, she will be less than three months in passing from eastern elongation to inferior conjunction. In the former case the motion is direct, or in the order of the signs; in the latter case the motion is retrograde, and the planet appears to move faster. This most brilliant part of her course will form a planetary study for the student of the stars, as easily followed as it is interesting and illustrative of the laws that govern the inner planets as they oscillate in straight lines east and west of the sun.

The work of getting ready for the Transit of Venus goes on with increasing ardor as the time for the occurrence of the phenomenon draws near. At a moderate estimate, nearly a hundred transit expeditions have either arrived at their destinations, are on their way thither, are diligently making ready for their observing points, or are strengthening their resources at home. American astronomers are perfecting their plans. The Commission having the arrangements in charge has been obliged to wait long for an appropriation from Congress to defray the expenses. But the starting-points have been selected, and the leaders of the different parties have been chosen. There will probably be four stations in the Southern hemisphere. One is at the Cape of Good Hope, under Professor Newcomb; one at New Zealand, under Edwin Smith, of the Coast Survey; one at Santiago, Chili, under Professor Boss; and one in Santa Cruz, Patagonia, under Lieutenant Very, of the United States Navy. Some of the stations in this country will be Cedar Keys, Florida; San Antonio, Texas; and Fort Thorn, New Mexico. The directors will be Professors Hall, Harkness, Eastman of the Naval Observatory, and Professor Davidson of the Coast Survey.

Thus it will be seen that the United States will be worthily represented by some of her most famous astronomers, who will do valiant work for the cause. Photography is the weapon with which they will make their attack upon the sun, and the fairest of his family, and, if human skill can be relied upon, the sun himself will be made to record every feature of the transit. The French, who will observe at eight stations in the Western world, depend upon contacts for their means of attack, as also do the English and Belgians, while the Germans hope to accomplish great things with the heliometer. The Germans thus far have selected two stations farther north than those chosen by other foreign nations; one is at Hartford, Conn., and one is at Aiken, S. C. The uncertainty of the weather in the north temperate zone will prevent it from being extensively chosen as an observing locality, but some stations will be located there, in order to bring the observers at as widely separated points as possible. It is discouraging to think, that at only half of the stations clear weather may be anticipated, and that this expenditure of time, labor, and means will be all in vain as regards half of the observers. But the other half will have their labors crowned with a brilliant success, that will make up for the disappointment of those who equally serve the cause, though they "only stand and wait," while the whole band of observers will be rewarded by the gratitude of the generations that will tread the earth during the one hundred and twenty-

two years that must intervene before the year 2004, when another transit recurs.

Venus sets on the 1st a few minutes after eight o'clock in the evening; at the end of the month, she sets not far from half past seven o'clock.

MERCURY

is evening star, and wins the second rank on the planetary roll, on account of the incidents he contributes to diversify the annals of the month. On the 28th, at six o'clock in the afternoon, Mercury reaches his greatest eastern elongation, the day after Venus has touched the same point in her path. He is then $25^{\circ} 54'$ east of the sun, while Venus was $46^{\circ} 36'$ at her elongation the day before. Although at nearly his maximum distance from the sun, he is not favorably situated for observation on account of his southern declination, for the farther north the planets are the better is the opportunity for observing them. It is, however, the last time during the year when there is the least probability of his being visible as evening star.

The present will be an unusual opportunity for comparing the respective limits the two planets reach, as they travel eastward from the sun, and it will therefore reward diligent painstaking to obtain a sight of Mercury. The moon will be greatly in the way, and will make it difficult to pick him up before elongation, but he may be looked for immediately after. Venus will show her bright face in the west almost as soon as the sun has set, and will greatly help in finding where to look for Mercury. He will be found about midway between Venus and the sun, seven degrees farther north than Venus. He sets on the 28th, about half-past six o'clock. Venus sets on the same day, about half-past seven o'clock. An opera-glass will do good service in discovering the smallest of the planets, after the point in the sky where he may appear is approximately calculated.

On the 20th, Mercury is in conjunction with the first magnitude star, Alpha Virginis, better known as Spica. The point of nearest approach between the star and the planet occurs at eleven o'clock in the morning, when they are only twelve minutes apart, Mercury passing north. The time to look for them will be on the evenings of the 19th and 20th. On the former evening, Mercury will be west of Spica; on the latter, he will be east of the star. The scene of the conjunction between Venus and Mars in August will be repeated with different actors in the parts. A good opera-glass, or a small telescope, will bring the stars into the field, Mercury's position differing little from that marked out for the 28th. The Lone Star, as Spica is sometimes called, and the little planet will make a rare and beautiful picture on the twilight sky. Mercury sets on the 19th, a few minutes before seven o'clock, about three-quarters of an hour after the sun.

On the 21st, Mercury is in conjunction with Mars, at one o'clock in the morning, passing a little more than two degrees south. It is barely possible that bright-eyed observers may obtain a view of the planets near conjunction on the evenings of the 20th and 21st, if the sky be exceptionally clear. Mercury is then ten degrees south of the sun, eight degrees north of Venus, and about two degrees and a half south of Mars. This active planet, besides reaching his eastern elongation, and playing a part in two conjunctions, is in his descending node on the 6th, and in aphelion on the 16th. Thus, it will be seen that he is a busy member of the family during September.

Mercury sets now a few minutes after seven o'clock in the evening; at the close of the month he sets about half-past six o'clock.

JUPITER

is morning star, but wins the third place on the list for the importance attached to his movements, and the fact that he reaches quadrature on the morning of the 23d. This magnificent planet then hangs self-poised, midway between conjunction and opposition, ninety degrees from each point, rising about midnight.

The sky in the early morning now presents a charming picture, the beautiful scene amply repaying the early riser for the effort required in order to witness it. Saturn leads the starry host as he mounts to the meridian. He is almost in line with the glimmering Pleiades, while ruddy Aldebaran glows below him. The princely Jupiter appears farther north than his brother planet, heralded by the brilliant Capella, and followed by the mighty Orion. It is seldom that the planets are attended by a court of such eminent rank, and every lover of the stars should behold the fascinating spectacle at least once during the month.

Jupiter rises on the 1st about twenty minutes before twelve o'clock in the evening; at the close of the month he rises about ten o'clock.

SATURN

is morning star, and ranks fourth in importance on the monthly roll, though his path is marked by no incident of interest. This grand member of the solar family is steadily coming nearer, and has so far advanced towards his nearest approach or opposition, that at the end of the month his serene face will come glowing above the horizon at eight o'clock, to be followed two hours later by the more imposing mien of Jupiter. For two months to come the two planets, though not near in reality, will be inseparably linked in the attention of the observer, who will gladly welcome their appearance in the evening sky, though they are still included in the list of morning stars.

Saturn now rises a few minutes before ten o'clock in the

evening; at the close of the month he rises a few minutes before eight o'clock.

MARS

is evening star, and scarcely worth mentioning for any part he plays in September. Contented with the laurels won in August, when he played the subordinate part in the lovely pictures with which, in connection with Venus, he diversified the evening sky, as now approaching, now hanging in close vicinity, and now receding, the two planets crossed the celestial track with devious steps. We have already alluded to the conjunction of Mars and Mercury on the 21st. By the end of the month, the ruddy planet will become invisible to mortal view, for, setting only a half-hour after the sun, he is eclipsed in the solar rays.

Mars now sets about twenty minutes before eight o'clock in the morning; at the close of the month he sets not far from half-past six o'clock.

NEPTUNE

is morning star, and retains his place as the herald of the morning trio, pursuing his unseen course without an event worthy of record. Those who would trace his place on star-maps, will find it, on the 1st, in Right Ascension 3h. 7m., and in declination $15^{\circ} 42'$ north.

Neptune rises now about half-past nine o'clock in the evening; at the end of the month he rises about half-past seven o'clock.

URANUS

is evening star until the 11th, when, at three o'clock in the afternoon, he comes into conjunction with the sun, and is morning star for the rest of the month. He is the last of the four giant planets to reach this goal, turning the point when they are far on their way to opposition. At conjunction he is joined with the sun, rising and setting with him, and as completely hidden from human gaze as if he were blotted from the sky.

Uranus sets on the 1st a few minutes before seven o'clock in the evening; at the close of the month he rises about half-past four o'clock in the morning.

THE MOON.

The September moon falls on the 27th, twenty-six minutes after midnight. It is the superb harvest moon, one of the crowning glories of the autumn. On account of the position of the ecliptic in regard to the equator, she rises for several consecutive evenings with only a comparatively short interval of time intervening, and thus seems to prolong the day, as she pours her floods of silvery light over the perfection of nature's handiwork, the harvest of the year. Poets have always sung the praises of the harvest moon as the surpassing wonder of the autumn nights, but, in our view, the winter moon, as she "runs high" in the heavens in the crisp, cool nights, is the most beautiful moon of the year.

The waning moon is in conjunction with Neptune on the 2d, with Saturn on the 3d, with Jupiter on the 5th, and with Uranus on the 12th. The new moon of the 12th is in conjunction with Mercury and Mars on the 14th, and with Venus on the 16th, passing a degree and a half north of the radiant evening star, and thus giving to observers a view of one of the most lovely pictures the heavens present—the silver crescent, near the fairest of the stars.

THE TELESCOPE.

Venus and Mercury will lose the gibbous phase when they reach elongation, both presenting the appearance of the moon at the last quarter, half the disk being illumined. They will soon after take on the crescent form like the waning moon, and Venus will then become an object of increasing telescopic interest. The near approach of Mercury and Spica will be an interesting study, for it will bring in contrast the crescent of the planet and the unvarying point of light characteristic of the fixed star in the largest as well as the smallest telescopes.

September cannot be called a monotonous month on planetary annals. It presents to the student of the stars studies of exceeding interest. Venus and Mercury reach their greatest eastern elongations within a day of each other. Mercury appears in the twilight sky in close conjunction with a star of the first magnitude, the "lone" Spica, and again plays a part in conjunction with Mars. Jupiter reaches his half-way house, and, thenceforth, as we see, the stars hang nearer the earth than the sun. He holds his court in the early morning, amidst a galaxy of stars that makes the star-lit sky tremulous with brightness. The four-days-old moon, in conjunction with Venus, illumines the western sky with one of the loveliest pictures of the month. The harvest moon makes the nights of her sway among the most charming of the year. She reminds observers that fresh clouds have again been seen by the same observer floating over the Mare Crisium, and inspires the hope that the changes that have been noticed from time to time in lunar scenery may be substantiated by farther observation, and result in discoveries of startling interest concerning our nearest celestial neighbor and companion sphere.

Fast Packing of Shingles.

A shingle packing contest for a \$200 prize was lately decided at Saginaw, Mich. Jack Lyons gained the victory, after ten hours of steady and rapid work, with a score of 59,250. He was closely pursued by Robert Scott, who packed 59,100 shingles.