

ASPECTS OF THE PLANETS FOR NOVEMBER.

NEPTUNE

is morning star until the 16th, when he becomes evening star. Though his ascendancy is shortlived, he takes the lead on the November record, for on the 16th, at 3 o'clock in the morning, he reaches the most interesting epoch in his course—his opposition with the sun. He then passes from the sun's western side to his eastern, and becomes evening star in technical classification, though in reality he has been evening star for several months. He is nearest to the earth, or in line with the earth and the sun, the earth being in the middle. But in order to be at his nearest possible point to our planet, he must be in perihelion as well as in opposition. Under these rare conditions, for he is in perihelion but once in his long circuit of 165 years, his distance from the earth is 2,629,360,000 miles. Under opposite conditions, in aphelion as well as conjunction, his distance is 2,863,183,000 miles. These figures give little idea of the vast realm of space to be traversed before the abiding place of the most distant known member of the solar brotherhood is reached.

There are advantages, however, to be derived from the opposition of a planet as far away as Neptune. He may never be seen with the naked eye, but is in the best position for telescopic observation. A good glass will quickly show the difference between this planet and a star, for it will bring out a disk, while a star will forever remain a point, even in the most powerful telescope.

Observers who wish to look for Neptune will find the present the most favorable time. He may be found about 7° south of the Pleiades, and about the same distance west of Aldebaran. He takes on the form of a small round disk, of a pale blue color, and is accompanied by a satellite, a point of light close to the primary.

Neptune, though the most distant planet, has the shortest synodic period of any of the outer planets, traveling from opposition to opposition again in about 368 days. Thus, knowing the time of opposition for one year, it may be found for the next by adding three days. This computation is approximate, but will answer for all ordinary purposes. The reason is plain. The earth makes the circuit of the ecliptic in a year, passing through one constellation of the zodiac in a month. Neptune moves so slow that it takes him 165 years to make a revolution around the ecliptic, or more than 13 years to move through a single constellation of the zodiac. The earth, therefore, after completing a revolution, will overtake her slow-moving brother in about three days, when sun, earth, and Neptune will be in line, and a synodic revolution will be completed.

The most interesting point concerning Neptune is the possibility that he may be the agent for detecting a planet traveling twice his own distance from the sun—an ultra-Neptunian planet, as it is called. Astronomers are diligently sweeping the skies with this purpose in view, founding their expectations upon analogy and some unaccountable perturbations in the movement of the planet who has been a known member of the solar family for only forty years.

The right ascension of Neptune on the 1st is 3 h. 30 m.; his declination is 16° 11' north; his diameter is 2.6"; and he is in the constellation Taurus.

Neptune rises on the 1st at half past 5 o'clock in the evening; on the 30th he sets about half past 5 o'clock in the morning.

VENUS

is evening star. Nothing in planetary presentation is more charming than her nightly appearance in the western sky in the early evening. Almost as soon as the sun sinks below the horizon she springs into being, and for a time reigns alone, no other star bearing her company. She grows dazzlingly beautiful as the shadows darken and, as she quickly follows the great luminary below the western hills, wins a tribute of admiration from every beholder, and leaves behind her but one regret—that her presence in the sky is of so short duration. There is a great improvement in this respect during the month. At its commencement, the fairest of the stars delights the observer for two hours after sunset. At its close, she lingers in the west for three hours after the departure of the great luminary. The path of Venus has tended to the south for several months, but, after the 10th, she turns her steps northward. This will increase the length of her stay above the horizon, and bring her into better position for observation.

The right ascension of Venus on the 1st is 17 h. 31 m.; her declination is 25° 52' south; her diameter is 18"; and she is in the constellation Scorpio.

Venus sets on the 1st at 10 minutes before 7 o'clock in the evening; on the 30th she sets at half past 7 o'clock.

SATURN

is morning star on astronomical records, although on the 1st of the month he rises at 8 o'clock in the evening. He is visible nearly the whole night, making his appearance in the east about an hour after his fair rival Venus disappears in the west. Here reigns assolate representative of the visible planetary brotherhood until midnight, when Mars appears upon the scene, while about the time he reaches the meridian, Jupiter looms

above the eastern horizon. Saturn is in fine position for star gazers during the whole month, for he is just past perihelion, approaching opposition, nearly in his highest northern declination, and his rings are open to their widest extent. Observers are wise who carefully study his present aspect, for a change will before long be perceptible, and many years will roll on before his present serene splendor and clear light will again gladden our eyes.

Saturn has been moving eastward, or in direct motion, but is now retrograding, or moving backward, and will keep on this course until the end of the year.

The right ascension of Saturn on the 1st is 6 h. 35 m.; his declination is 22° 17' north; his diameter is 18.2"; and he is in the constellation Gemini.

Saturn rises on the 1st a few minutes after 8 o'clock in the evening; on the 30th he rises soon after 6 o'clock.

JUPITER

is morning star. He is now far enough from the sun to make a fine appearance in the small hours of the morning, rising about 3 o'clock on the 1st of the month, and at 1 o'clock at its close. He takes the lead of the starry host as soon as he makes his advent, outshining them all, as he makes his stately march to the zenith. Unfortunately for terrestrial observers, his course tends southward, almost touching southern declination when the month closes, and six years must pass before he makes the circuit of the six southern constellations of the zodiac. Planets are not in the best condition for observation when in southern declination, for, like the sun, their stay above the horizon is shortened for northern observers. Jupiter may be found between Regulus and Spica, almost directly in the east.

The right ascension of Jupiter on the 1st is 11 h. 52 m.; his declination is 2° 1' north; his diameter is 30.6"; and he is in the constellation Virgo.

Jupiter rises on the 1st about a quarter before 3 o'clock in the morning; on the 30th he rises soon after 1 o'clock.

MARS

is morning star. He is slowly increasing in size and in ruddy hue, and may be easily found in the eastern sky by his vicinity to well known stars. On the 4th he passes 1° north of Regulus, and on the 16th he passes 2° north of Rho Leonis. He shines with a red light, plainly distinguishable from the twinkling points around him.

The right ascension of Mars on the 1st is 9 h. 58 m.; his declination is 14° 8' north; his diameter is 6.4"; and he is in the constellation Leo.

Mars rises on the 1st just after midnight; on the 30th he rises about a half past 11 o'clock in the evening.

MERCURY

is evening star. On the 30th, at 6 o'clock in the evening, he reaches his greatest eastern elongation, being 21° 21' east of the sun. He may, about that time, possibly be visible to the naked eye, but it will be a difficult matter to pick him up, for he sets an hour and a quarter after the sun, and is in southern declination. He must be looked for, in the west, three-quarters of an hour after sunset, a short distance west of the inverted dipper in Sagittarius.

The right ascension of Mercury on the 1st is 15 h. 6 m.; his declination is 18° 31' south; his diameter is 4.8"; and he is in the constellation Sagittarius.

Mercury sets on the 1st at 5 o'clock in the evening; on the 30th he sets at half past 5 o'clock.

URANUS

is morning star.

The right ascension of Uranus on the 1st is 12 h. 21 m.; his declination is 1° 33' south; his diameter is 3.5"; and he is in the constellation Virgo.

Uranus rises on the 1st about half past 3 o'clock in the morning; on the 30th he rises about half past 1 o'clock.

THE MOON.

The November moon falls on the 22d, at 4 h. 39 m. A.M. On the 3d, three days before her change, the waning moon is in conjunction with Jupiter, at 4 h. 12 m. A.M., being 52' south, the crescent and the bright planet making a lovely picture on the morning sky. On the 3d, our fair satellite also draws near to Uranus, at 5 h. 17 m. P.M., passing 18' north. On the 7th, the new moon of the 6th is in conjunction with Mercury, at 3 h. 47 m. P.M., being 6° 16' north. On the 10th the moon is at her nearest point to Venus, at 2 h. 35 m. P.M., being 7° 49' north. On the 21st she is near Neptune, at 4 h. 55 m. P.M., being 2° 40' south. On the 24th she is in conjunction with Saturn, at 5 h. 26 m. P.M., being 3° 59' south. On the 29th she is in conjunction with Mars, at 4 h. 12 m. A.M., being 3° 23' south. On the 30th she again swings her ponderous orb near Jupiter, at 5 h. 24 m. P.M., being 21' south, approaching the planet much nearer than on the conjunction of the 3d.

NOVEMBER

is not as fruitful in incidents as many of the months that have preceded her in the now rapidly fleeting year. She presents, as prominent in importance, the opposition of Neptune, when the planet third in size among the brotherhood draws nearest to the earth on his unseen path, and gives the telescopist the best

chance to learn something new concerning the huge sphere that, in our view, takes on the form of a tiny blue disk, no larger than a little ball that serves for a child's plaything, but is in reality nearly a hundred times the size of the earth. She presents, also, on each clear evening one of the loveliest pictures that glows on the celestial canvas. It is that of the peerless Venus shining in the west as the radiant evening star, deigning to show her bright face as soon as the sun is lost to sight, and growing more bewitchingly beautiful till her turn comes to descend below the western hills. Saturn is another gem in the November sky, Jupiter dons his brilliant robe in the small hours of the morning, and Mercury may be seen in fitful phase as the month closes.

November holds one source of unfailing interest, for during her reign the earth plunges headlong through the November meteor zone. Those who watch on the nights of the 12th, 13th, and 14th will find proof of the passage in a few stray meteors radiating from the constellation Leo, and set on fire by a concussion with the earth's atmosphere. The November meteoric showers are caused by the earth encountering a swarm of particles following Tempel's comet in its orbit. The swarm of meteoroids is not yet equally scattered, and the earth meets the densest portion once in 33¼ years. A grand display marks the passage. The heavens seem to be on fire, and the sublimity of the scene is indescribable. Chinese, Arabian, and other records give accounts of meteoric showers that occurred centuries ago.

Humboldt, while traveling in the Andes, saw a wonderful shower in 1799. One was seen in this country in 1833, another occurred in 1866-67, and one is confidently expected in 1899. The November meteor zone is a gigantic hoop or ellipse, crossing the earth's orbit at a point passed by our planet on the 13th of November, and extending beyond the orbit of Uranus. It has a period of 33¼ years. Leverrier thus accounts for its presence in the solar system: As far back as the year 126 of our era the planet Uranus captured a meteoric comet, and imprisoned it within the boundaries of the sun's domains. The comet is disintegrating, and the meteoroids are slowly extending over the whole zone. When this takes place, thousands of years hence, the great displays will cease, and a greater number of falling stars will be seen every year. As nothing is more uncertain than the behavior of comets and meteors, it is well to be on the watch. It may be that the observers of the present year will find a rich harvest to reward their labor. The best time for observation is about 3 o'clock, when the constellation Leo, from which the meteors radiate, is about half way between the eastern horizon and the zenith.

Use of Shorthand.

The use of shorthand in the trial of causes in courts is having the effect of greatly lengthening out the record of causes, making it expensive in case of appeals, requiring also a great deal of time in examining a case at the hearing on appeal. This subject attracted the attention of the American Bar Association at its late session at Saratoga, where the following suggestion was adopted: "The record of a trial should contain short hand notes of all oral testimony, written out in long-hand, and filed with the clerk; but only such parts should be copied and sent to an appellate court as are relevant to the point to be discussed on the appeal; and if more be sent, the party sending it should be made to pay into court a sum fixed by the appellate court, by way of penalty."

Judges are also beginning to complain of the increased amount of labor imposed upon them in examining written arguments of counsel where the same are prepared through the aid of shorthand writing. In such cases it is found that lawyers do not present their points as clearly and concisely as if written out by themselves in the usual way. This, however, does not argue against the use of shorthand; it only shows that lawyers should use more care in the preparation of their arguments by presenting their points as concisely as possible.—*The Legal Adviser.*

The Pennsylvania Aerolite.

In a recent communication to *Science*, Prof. Langley states that so many inquiries concerning the reported meteorite were directed to Allegheny Observatory, that he finally sent a competent observer to the alleged locality of the fall in Washington County, in order to find out the true facts in the case. An investigation on the spot, however, failed to discover any meteorite. One undoubtedly passed over the spot, and was seen to burst in midair in a southerly direction from the town of Independence. The report, according to one of the spectators, was heard a minute or more after the explosion was seen; from this and the apparent height at which the meteor burst, it is inferred that the actual explosion occurred twelve or fifteen miles to the southward, when the meteor was still two or more miles above the earth. No fragments are as yet known to have been found. The amount of romance mixed up with earlier accounts has exceeded even our somewhat large expectations.