ASPECTS OF THE PLANETS FOR JANUARY.

JUPITER

is morning star until the 19th, and then evening star until the 7th of August. There is no question as to which star shall head the list during January, for Jupiter puts on his proudest aspect on the 19th, when he reaches opposition. This event occurs at 10 o'clock in the evening, when the regal planet will be well toward the zenith, and can be seen in his best estate. Though Jupiter never shines with the bewitching brightness that distinguishes Venus in her period of greatest brilliancy, he enjoys a great advantage over his fair rival. Since he is an outer planet, he may be seen at opposition, opposite the sun, rising about sunset, and making his transit, or meridian passage, at midnight. Since Venus is an inner planet, she is never seen much more than 45° from the sun, either three hours after sunset or three hours before sunrise. Jupiter seems to make the circuit of the sky. Venus seems to oscillate in straight lines east and west of the sun as if she were fastened to him by an invisible chain. In reality, both planets revolve around the sun the same as the earth. The different aspects they take on are simply the way they look to terrestrial observers, the giant planet traveling outside of our domain, the fairest of the planets traveling within our boundaries.

We never look upon Jupiter when in opposition without rejoicing that when the vast nebulous mass that once filled and extended far beyond the limits of the solar system quickened into life, and threw off the concentric rings that formed the planets, the largest rings condensed into the planet Jupiter. Observers on the other planets are for this reason privileged to behold the magnificent spectacle of a planet second only to the great sun himself, a miniature solar system with its revolving moons, a telescopic wonder on which the eye rests with ever new delight.

The huge planet has not yet cooled down, his primeval fires still blaze, and he gives out light and heat to the satellites that surround him, and as readily yield to his sovereign power as their mighty lord bows to the sun's resistless sway. Observers on this planet, nearly 500 million miles away, can watch the process of world making on Jupiter's mighty mass. Exceeding the earth in volume 1,300 times, his cooling will be proportionally slow.

In the belts that diversify his disk, in the huge spots that from time to time stir his mass, in the agitation of the immense cloud atmosphere that conceals his fiery nucleus, we behold on a grand scale the progress of the cooling process which millions of years ago agitated the earth's lesser bulk before it developed to the perfection of its present condition as an abode for animate life. Just as surely will the prince of planets reach, latest of all the sun's family, the same perfection of development. When, millions of ages hence, the time arrives, the earth, like the moon, will have passed into the period of inevitable decay, and, preceded by Mercury, Mars, and perhaps Venus, will be floating through space as a dead world. Viewed in this light, every changing belt, every new spot, every sudden rift is a revelation in Jovian language of the tremendous disturbances that will eventually bring order out of chaos, beauty out of desolation.

The red spot and the bright spot have not actually disappeared, although as the planet sped on its course away from the earth no traces of them were seen later than May. As the planet again approached us after conjunction, Mr. Denning found on the morning of the 6th of October that the red spot was again visible, although very faint. At times the shape of the spot came out distinctly, notwithstanding its feebleness, while the indentation or hollow in the great south belt near the spot is a very conspicuous figure. Later, on the same morning, Mr. Denning saw the equatorial white spot as it crossed the central meridian of Jupiter. It was very bright and seemed to preserve the conspicuous appearance it presented in 1880. Observers will therefore have an object in the telescopic study of Jupiter besides the enjoyment of the brilliant spectacle. The red spot, the white spot, the intensity of the coloring in the belts, all have a meaning. Fortunate is he who can decipher it!

High up in the north, at his nearest point to the earth, above the horizon the entire night, the brightest of the swarming stars that adorn the crown of night—such is Jupiter at opposition, and superbly will he shine during the crisp and clear moonless nights of January.

The right ascension of Jupiter on the 1st is 8 h. 17 m.; his declination is 20° 14′ north; and his diameter is 43·4″.

Jupiter rises on the 1st about half past 6 o'clock in the evening; on the 31st he sets at 4 o'clock in the morning.

VENUS

is evening star. If Jupiter holds the first place, she unquestionably wins the second. She is now a beautiful object in the western sky for nearly two hours after sunset. Traveling from superior conjunction to eastern elongation, she is constantly receding from the sun in her eastern course, and, at the same time, approaching the earth. Observers who watch her movements will note her progress, and easily discern her increase in size and brightness, and the longer time she is above the horizon, and will rejoice that during the entire winter she will be the peerless starry gem outshining all others in the western sky.

Venus is moving rapidly northward, advancing 13° in that direction during the month, and greatly changing her position in regard to the sun, being now 2° 30′ north of the sunset point, and at the end of the month 10° north of the sunset point.

A charming aspect of Jupiter and Venus in their present phase is that they are above the horizon together during the whole month, Jupiter rising in the east before Venus sinks below the horizon in the west, the one reigning in the eastern sky, the other holding her court in the western. Jupiter now rises fifteen minutes before Venus sets. At the end of the month, Jupiter will rise before sunset, and Venus will not set till nearly 8 o'clock. They will therefore be visible for more than two hours, and, as one is apparently traveling east and the other west, they will seem to approach nearer each other.

The right ascension of Venus on the 1st is 20 h. 30 m.; her declination is 20° 40′ south; and her diameter is 11·4″.

Venus sets on the 1st about half past 6 o'clock in the evening; on the 31st she sets at ten minutes before 8 o'clock.

SATURN

is evening star, and secures the third place on the list in the order of beauty and brightness. He changes his position scarcely at all during the month, slightly retrograding. Thus his path is easy to follow. Though far exceeded in brilliancy by Jupiter, he is beautiful to behold, with his soft and serene light. Nearly half way to the zenith when the gathering shades of night reveal his presence in the sky, making his transit on the first at half past nine o'clock, and then sinking slowly in the west, followed by a retinue of the brightest stars that twinkle in the sky, and taking precedence of Jupiter and Mars on the celestial track, Saturn cannot fail to win an admiring tribute from every beholder during the starlit nights of January.

The right ascension of Saturn on the 1st is 4 h. 10 m.; his declination is 19°·6′ north; and his diameter is 19″.

Saturn sets on the 1st not far from half past 4 o'clock in the morning; on the 31st he sets about half past 2 o'clock.

MARS

is morning star, wins the fourth rank in the order of interest, and completes the quartet of planets visible during winter nights that are easily recognized by unscientific observers. He is growing wondrously ruddy in hue, and increasing in size as he rapidly approaches that point in his course when our planet will lie directly between him and the sun. Therefore he is very near his brightest phase, while his northern declination is increasing, always a favorable condition for observation. He is easily recognized as a brilliant red star southeast of Jupiter and northwest of Regulus in the handle of the Sickle.

The right ascension of Mars on the 1st is 9 h. 40 m.; his declination is 17° 54′ north; and his diameter is 13·2″.

Mars rises on the 1st a few minutes before 8 o'clock in the evening; on the 31st he rises about 5 o'clock.

MERCURY

is evening star until the 20th, and then morning star. On the 4th, at 11 o'clock in the morning, he reaches his greatest eastern elongation, being 19° 16′ east of the sun. He is then visible to the naked eye in the west soon after sunset, but his southern declination is not favorable for visibility. Venus will help to point him out, as he is a little way west of her, and a degree farther south. On the 4th, Mercury sets an hour and a half after the sun, and a half hour before Venus. With so bright a starry guide, and these directions to follow, any quick-eyed observer may hope to find the planet that loves to hide in the evening glow.

On the 20th, at 3 o'clock in the afternoon, Mercury has completed his course as evening star, coming into inferior conjunction with the sun and passing to his western side to commence his short circuit as morning star.

The right ascension of Mercury on the 1st is 20 h. 3 m.; his declination is 22° 3′ south; and his diameter is 6·2″.

Mercury sets on the 1st about 6 o'clock in the evening; on the 31st he rises about 6 o'clock in the morning.

URANUS

is morning star. He is in the constellation Virgo, and is stationary nearly the whole month.

The right ascension of Uranus on the 1st is 11 h. 54 m.; his declination is 1° 26′ north; and his diameter is 3·8″.

Uranus rises on the 1st at 11 o'clock in the evening; on the 31st he rises at 9 o'clock.

NEPTUNE

is evening star. He still holds his one claim to distinction, heading the procession of outer planets in the time of his appearance, making now his transit at half past 8 o'clock in the evening.

The right ascension of Neptune is 3 h. 6 m.; his declination is 15° 36′ north; and his diameter is 2·6″.

Neptune sets on the 1st about half past 3 o'clock in the morning; on the 31st he sets about a quarter after 1 o'clock.

THE MOON.

The January moon fulls on the 12th at twenty-seven minutes after 10 o'clock in the morning, New York standard time. On the 8th, at two minutes after one o'clock in the morning, the moon makes a close conjunction with Neptune, being 6′ north. She will occult the planet in some localities. On the 9th, at fourteen minutes after 2 o'clock in the morning, she is in conjunction with Saturn, being 1° south. She will occult Saturn in some localities between 25° and 71° south declination, the only time during the year. On the 13th she is in conjunction with Jupiter, on the 14th with Mars, on the 17th with Uranus. On the 26th, two days before her change, she is at her nearest point to Mercury. Her last conjunction is the most interesting, for on the 30th the two days' old moon hangs her silver crescent a few degrees north of the lovely evening star. Planet and crescent, though the approach is not near, form a picture on the celestial canvas of which the eye never grows weary.

Patents in England.*

On the first day of next month—January, 1884—the new patent bill of Great Britain goes into force, by which a great reduction is made in the cost of obtaining patents there and considerable of the red tape required under the old system is done away with.

The cost for a patent in England will hereafter be about the same as a United States patent, and Scotland, Ireland, Wales, and the Channel Islands will be included in the protection.

Persons desiring to obtain patents in England, however, must not overlook the fact that if the article to be patented has been introduced into the country, or copies of the United States patent have been in such way open for general inspection that the public may be presumed to have knowledge of them, as in a reading room, library, etc.—before a patent has been applied for—a valid patent cannot be obtained.

The English law differs materially from ours in the matter of showing ownership in inventions. No examinations are made to determine this, and patents are granted jointly to the inventor with others, although there must be a declaration from the inventor that he is the true and first inventor. The doing away with examinations, to determine if the invention possess novelty, will prevent the vexatious delays so often attending the obtaining of a patent through our Patent Office.

The new law likewise provides that each application for a patent must be confined to one invention. The original declaration and provisional specification go to an examiner only to see that the invention is fairly described and correctly entitled. In case two applications for the same thing are pending in the office at one time, such cases will be decided upon by the head of the Patent Office, subject to appeal by the applicants to the law officers.

A large number of cases are being prepared to be filed in the London Patent Office as soon as the new law goes into effect. A much larger proportion of our patentees will, undoubtedly, seek protection for their inventions in Great Britain than have heretofore done so, for the cost now will be small compared with the expense of obtaining a patent under the old law.

Coverings for Steam Pipes, etc.

A little more than a year ago several fires in New England cotton mills were attributed to pipe coverings, and it was thought the felted, fibrous substance thereof, with possibly a little grease, had caused spontaneous combustion. This theory was discarded on investigation, but it led to an examination of the qualities and efficiency of the different boiler and pipe coverings in the market, for which purpose Prof. John M. Ordway, of the Massachusetts Institute of Technology, was specially appointed. His conclusions are, that the best coverings are those mostly of light, fibrous, or porous substances; such as hair felt, slagwool, charcoal, rice chaff, and silica, or "fossil meal," while a paste or mortar plastered on is generally inferior. A moderate air space is recommended, the best ribs or props to hold the case off from the pipe surface being plaster rings cast in halves and clamped on the pipe by tying a string or wire around the two halves. Silicated charcoal and slag wool may be applied directly to the pipe, being inclosed with cloth, or a casing of sheet metal or straw board; while for the Southern States rice chaff, moistened with water-glass at 30° B., and sewed up in a cloth wrapper, is recommended.

The Eucalyptus.

Where there is surplus moisture to dispose of, as, for example, a cesspool to keep dry, a large eucalyptus, states the Pacific *Rural Press*, will accomplish not a little, and a group of them will dispose of a vast amount of house sewerage. But if you have water which you do not wish to exhaust, as in a good well, it would be wise to put the eucalyptus very far away. Daniel Sweet, of Bay Island Farm, Alameda County, recently found a curious root formation of the eucalyptus in the bottom of his well, about sixteen feet below the surface. The trees to which the roots belonged stand fifty feet from the well. Two shoots pierced through the brick wall of the well, and sending off millions of fibers, formed a dense mat that completely covered the bottom of the well. Most of these fibers are no larger than threads, and are so woven and intertwisted as to form a mat as impenetrable and strong as though regularly woven in a loom. The mat when first taken out of the well was water soaked and covered with mud, and nearly all a man could lift, but when dry it was nearly as soft to touch as wool, and weighed only a few ounces. This is a good illustration of how the eucalyptus absorbs moisture, its roots going so far to find water, pushing themselves through a brick wall, and then developing enormously after the water is reached. Mr. Sweet thinks one of the causes of the drying up of wells is the insatiable thirst of these vegetable monsters

* Note.—Persons desiring to know as to the cost of patents in England under the new law and how to obtain them, will be furnished with full information by calling at the office of this paper, or they will receive a pamphlet by mail which will give the facts as to securing patents there, and in all other foreign countries.