ASPECTS OF THE PLANETS FOR MARCH.

URANUS

is morning star until the 11th, and evening star for the rest of the month. He wins the place of honor in March for two reasons: he is in opposition and visible to the naked eye. On the 11th, at midnight, he is in opposition or opposite to the sun, rising at sunset and setting at sunrise. He is then in a straight line with the earth and sun, the earth being in the center, and is 1,745 million miles from us instead of 1,928 million miles—his distance at conjunction. Uranus at opposition passes to the sun's eastern side, and becomes evening star, playing the same role with Neptune, Saturn, and Jupiter, the four giant planets being on the same side of the sun, and all traveling from opposition to conjunction.

Uranus has completed his seven years' course in Leo, and has entered Virgo, which he will traverse in the same time. As his year is equal to eighty-four of our years, it takes him seven years, on the average, to pass through each constellation of the zodiac. Though when brightest, as at present, his diameter is not quite four seconds, he shines as a star of the sixth magnitude, and can therefore be seen with the naked eye. The best time to look for him is about 9 o'clock in the evening, in the eastern sky. As he rises about sunset, he will then be half way to the meridian. He is very near Beta Virginis, a star of the third magnitude in the southern wing of Virgo, and about 12° south of Denebola in Leo. A good observer, with these directions, will be able to pick up this far-away planet as a small, faint star on any clear, moonless night. An observation with the telescope is more satisfactory. An instrument of four or five inches aperture will bring him out perfectly defined as a small sea-green moon, deliciously delicate in tint, and two of his four moons may also be seen. But the two smaller ones are among the most difficult objects in the solar system to detect, and have only been certainly seen in the largest telescopes in the world.

Uranus travels from opposition to opposition again in four days and a half more than a year, the time varying but slightly till the end of the century. Therefore his opposition next year will occur on the 16th of February, the following year on the 20th of February, and so on.

The right ascension of Uranus is 11 h. 31 m.; his declination is 4° 1′ north, and his diameter is 3·8″.

Uranus rises on the 1st at thirty-nine minutes past 6 o'clock in the evening; on the 31st he sets a few minutes after 5 o'clock in the morning.

MERCURY

is morning star, and is visible to the naked eye during nearly the first half of the month. The reason for his visibility is that on the 3d he reaches his greatest western elongation and is far enough from the sun to be seen for a short time before his lesser light is quenched in the overpowering solar rays. Three conditions are necessary to obtain the best view of Mercury. He must be at his maximum distance from the sun at elongation, he must be as far north of the sun as possible, and the twilight must be short. The first and third of these conditions are fulfilled at the present time, but his southern declination is the drawback. Observers who command a view of the eastern horizon may find him on clear mornings about nine degrees south of the sunrise point, but those who hope for success must know where to look. Venus shines brightly about sixteen degrees west and a little farther south, while the first magnitude star Fomalhaut is about the same distance southeast. The best time for observation is three-quarters of an hour before sunrise, when those who are fortunate enough to pick him up will behold a brilliant white star with a rosy tint, superb in luster, and sometimes playing hide and seek, as he now disappears and now reappears in the increasing dawn that heralds the sun's approach.

On the 9th, Mercury is in conjunction with Delta Capricorni, a little star in the tail of Capricornus, passing 1° 24′ north. The conjunction may be seen with a good opera glass.

On the 17th Mercury is in conjunction with Mars, being about one degree south. The conjunction is interesting in showing how near the planets are together, though both at the time are too near the sun to be visible.

The right ascension of Mercury is 21 h. 8m., his declination is 16° 40′ south, and his diameter is 7·2″.

Mercury rises on the 1st about half past 5 o'clock in the morning; on the 31st he rises about twenty-four minutes after 5 o'clock.

MARS

is morning star, but is at present of the least account of all the brotherhood. His near approach to Mercury on the 17th has already been recorded.

The right ascension of Mars is 21 h. 33 m., his declination is 15° 40′, his diameter is 4·4″, and his place is in Capricornus.

Mars rises on the 1st a few minutes before 6 o'clock in the morning; on the 31st he rises a few minutes before 5 o'clock.

VENUS

is morning star. Though still beautiful to behold, she has fallen from her highest estate, for her bright face grows dim; her stay in the morning sky decreases in time as she travels on her westward way, retracing her steps toward the sun and increasing her distance from the earth. She, as well as Mercury, pays her respects to Delta Capricorni, passing the star on the 26th about three degrees north. Thus Venus, Mercury, and Mars are all in Capricornus during some part of the month, near each other and near the sun.

The right ascension of Venus is 19 h. 48 m., her declination is 19° north, and her diameter is 21·6″.

Venus rises on the 1st at seventeen minutes after 4 o'clock in the morning; on the 31st she rises at ten minutes after 4 o'clock.

JUPITER

is evening star, and plays the same brilliant part he has played for several months as leader of the resplendent host of heaven. Although traveling from us, his luster scarcely shows any perceptible diminution, and, until he sinks below the horizon, the eye singles him out at a glance from his twinkling companions.

On the 13th, at 9 o'clock in the morning, he reaches quadrature. Hanging in superb equipoise half way between opposition and conjunction, rising at noon-day, reaching the meridian at 6 o'clock, and setting at midnight, he has reached a position where he appears to almost as good advantage as when he takes on his most imposing aspect at opposition.

Jupiter never fails to excite profound interest, whether we follow his course with the naked eye or through the telescope. The telescopic view just now is full of excitement. The Prince of Planets has met with a loss. The "great red spot," 26,000 miles long, and 6,000 or 8,000 miles broad, has almost entirely vanished. The extraordinary phenomenon that has been eagerly and assiduously watched since its appearance in 1878 has nearly disappeared, and zealous observers are little the wiser for the study bestowed upon it. Various opinions prevail concerning its origin and constitution. Some astronomers think it was an enormous rift in the planet's cloud-atmosphere, revealing the nucleus beneath. Others think that it was a slag or crust formed on the semi-fluid surface of the planet, revolving with it, and now melting down and disappearing. Others think it was a kind of cloud of smoke coming from a long-continued volcanic eruption on the planet underneath. Doubtless new spots will succeed, and some time in the distant future astronomers will decipher their meaning. But the time is not yet.

The right ascension of Jupiter is 5 h. 24 m., his declination is 23° 2′ north, and his diameter is 38·8″.

Jupiters sets on the 1st a quarter after 2 o'clock in the morning; on the 31st, he sets at half past 12 o'clock.

SATURN

is evening star, ranking second on the list in size and brightness. There is nothing specially noteworthy in his course during the month, as he slowly makes his way toward the sun. Observers will notice the comparative shortness of his stay above the horizon, as he sets now a half hour before midnight.

The right ascension of Saturn is 3 h. 15 m., his declination is 16° north, and his diameter is 16·6″.

Saturn sets on the 1st at half past 11 o'clock in the evening; at the end of the month he sets a few minutes before 10 o'clock.

NEPTUNE

is evening star, and continues to take precedence in the time of setting. The distance between Neptune and Saturn is slowly increasing, Neptune making his transit seventeen minutes before Saturn.

The right ascension of Neptune is 2 h. 57 m., and his declination is 15° 3′ north.

Neptune sets on the 1st a quarter after 11 o'clock in the evening; on the 31st he sets at twenty-one minutes past 9 o'clock.

THE MOON.

The March moon fulls on the 23d at twenty minutes past 1 o'clock in the evening. She is the most distinguished moon of the year, and exerts an untold influence upon the affairs of men; for the first full moon after the vernal equinox determines the time on which Easter shall fall. Easter in turn determines the time of the other movable fasts and feasts of the church. This year the moon fulls three days after the vernal equinox, and the following Sunday, the 25th, marks the Easter festival, within three days of the earliest date on which Easter can occur. The moon therefore decides that the Lenten season shall commence early this year.

The moon pays her respects to the planets in the following order: The waning moon is near Venus on the 5th, and near Mercury and Mars on the 7th. The new moon of the 8th is in conjunction with Neptune on the 12th, Saturn on the 13th, Jupiter on the 15th, and Uranus on the 22d. None of the conjunctions are near enough to be of special interest. Our neighbor, the moon, presents five phases during the month, being seen in the last quarter on the 2d and on the 31st.

RESHARPENING FILES.

The old method of giving files a second life was by recutting. So far as this was confined to files with sufficient body to sustain the second assault, it may have proved to be economical. But there are many files used which are necessarily thin and not capable of being reduced from their thinness.

To recut a file, the file must be ground down to the "plate," the smooth surface below the "roots" of the teeth. All the teeth must be ground out, and the space below the "roots" of the teeth also, if good afterwork is expected. And then it is only the thick files with fine cuts that are of any value for recutting purposes. With a coarse file, as a bastard, or a mill file, the blows of the cutter's hammer have disturbed the relations of particles in the slab of steel so seriously that they have almost disintegrated the steel before the hardening process had made the incipient cut of the chisel noticeable to sight or subject to fracture. So it does not always "pay" to anneal, grind, and recut a worn-out file.

But the useful life of the file may be perceptibly and economically prolonged by proper care. Sometimes the teeth of new files are broken off before performing useful work by "bearing on" to a file and attempting to rasp through the foundry skin of an iron casting. Sometimes new files are clogged with soft metals. In either case the trouble has been done before the file has had its chance. The newly-cut teeth of the file should be protected from abuse. The file tooth is similar to the razor edge, and has a fringe of self-supporting fibers requiring the gentlest treatment at the first. After this "wire-edge" is worn off—not roughly broken off—the file teeth are ready for their daily duty. To perform this they should be kept clean. It is not alone the finishing files, used with oil as a lubricant, which get foul with a gurry of oil and file dust; but there are dry-used files which have lodged between their teeth slices of wrought iron, splinters of steel, and crumbles of composition, of brass, of bronze, or of babbitt. To remove these obstructions is one of the duties of a filer, and the proper methods for this removal ought to be a part of every filer's education or a lesson in his instruction.

For cleaning a greasy finish file there is nothing better than a burning over the forge fire, in the flame of an alcohol lamp, or of a gas blaze. The burning should be done by a gentle passage to and fro through the flame, until the grease on the file burns with a blaze. Then the blaze should be blown out and the file be carded. When cleaned, dip the file into a jar of lye, and clean in pure water.

For removal of clogged particles a chisel of flattened wire is as good as anything. This is used by hand, and its mechanical effect is simply to drive out the lodged particles by a ploughing process.

For resharpening of file teeth acids have been employed, and to a certain and limited extent they are valuable. For this process the file must be chemically clean. This is insured by a soluble alkali, as lye, or an immersion in benzine, or naphtha, or spirits of turpentine, then a bath in clean warm water. The cleansed file may be placed point down in a jar of acid made up of half nitric acid, half sulphuric acid, and the combined amount of water—that is, as much water as the quantity of the two acids. The file, resting toe down, may remain in this solution an hour or more, according to the depth of the teeth. But a much simpler method is to wash the cleansed file with the pickle at the foundry, and when it dries off wash it again, repeating the process several times, and finally washing off with clear water or with lye water and clear water.

It is doubtful, however, that this acid method ever really sharpens the teeth of the file. It cleans the file chemically, and allows it to do its work better than when the file is clogged and dirty. The only real resharpening of files is of a mechanical character, and that is a contrivance that shoots sand and water or emery and water against the file teeth, at their back, with the force of a boiler pressure of steam of from 60 lb. to 80 lb. per square inch. In this contrivance, which has been in successful use for many months in some of our large establishments, from a tank holding quartz, sand, and water the mixture is drawn up through flexible tubes and directed simultaneously against the upper and lower surfaces of the file by the force of the steam. The steam acts in this case exactly as it acts when employed as an injector of water into boilers—the steam force lifts the diluted sand bath and directs it, with its boiler force, against the teeth of the file as the file is passed back and forth through the converging fires of the two tubes.

The result is a great improvement in the useful life of worn-out files.

Estimates of Lighting Brooklyn Bridge.

At the February meeting of the trustees of Brooklyn Bridge, Engineer Martin reported bids for furnishing electric lights for the bridge as follows: Arnoux-Hochausen Electric Company, $15,750; United States Illuminating Company, $18,150; Schuyler Electric Light Company, $20,000; Edison Electric Light Company, $21,500; Brush-Swan Electric Light Company, $23,273; and the Fuller Electric Company, $25,455. The bids were for supplying seventy lights, the proposal to include engines, dynamos, conductors, lamps, lamp posts, and everything, except the steam, necessary to make a complete plant.

Preference was expressed for the acceptance of the second bid, owing to the circumstance that the lowest bidder had had less experience in circuit lighting. The question was referred to a committee. The cost of the bridge to date has been $14,345,686.72.

Rubber Lubricator for Belts.

Five parts of India-rubber are cut fine and melted together with five parts oil of turpentine in an iron well-covered vessel; then add four parts of resin, stir well, melt, and add four parts of yellow wax, stirring constantly while melting. This mixture while warm is added, with constant stirring, to a melted mixture of fifteen parts fish oil and five parts of tallow, and the whole is agitated until it has congealed. The mass is applied to old belts upon both sides in a warm place, and when the belts are in use, from time to time upon the inner side. By this treatment they become very durable.—*Chem. Centralblatt.*