POSITION OF THE PLANETS IN JANUARY.

MERCURY

is morning star. The swift-footed planet is the first member of the solar family to contribute an incident to the January record. He reaches his greatest western elongation on the first at 3 h. A. M., when he is 22° 17′ west of the sun. He is then visible to the naked eye, rising about an hour and three-quarters before the sun and a half hour later than Venus, who serves as a guide to his position. The observer will find him in the southeast. He should commence his quest at 5 o'clock in the morning, commanding a clear view of the horizon. Venus will quickly appear, and, a half hour later, Mercury will follow, being about 7° southeast of his brilliant neighbor. The morning must be exceptionally clear, or the search will be in vain, on account of the planet's great southern declination. A morning view of Mercury and Venus in near vicinity is worth getting up early to behold. Mercury, after elongation, approaches Venus, both planets oscillating eastward toward the sun.

The moon, one day before her change, is in conjunction with Mercury, on the 16th, at 4 h. 54 m. A. M., being 4° 11′ south.

The right ascension of Mercury on the 1st is 17 h. 12 m. His declination is 21° 12′ south, his diameter is 6″.4, and he is in the constellation Ophiuchus.

Mercury rises on the 1st at 5 h. 40 m. A. M.

On the 31st he rises at 6 h. 45 m. A. M.

JUPITER

is evening star. The mighty planet is in quadrature on the 6th, at 3 h. 15 m. A. M. He is then 90° or 6 h. east of the sun, is on the meridian at sunset, and sets at midnight. He has reached the second epoch in his course, counting his opposition as the first. His orbit is so much larger than the earth's that he shows no sensible phases, excepting that, when in quadrature, the limb farthest from the sun is slightly darkened. This is the best time for observing his moons. When Jupiter is exactly in opposition or conjunction, his shadow lies directly behind him, out of our sight, and we cannot observe the eclipses of his satellites, but only their transits across his disk. When he is in quadrature, and before and after this epoch, his shadow is on one side, and the whole phenomena in the revolution of his satellites may be witnessed.

Jupiter is in conjunction with Mars on the 25th, at 10 h. 59 m. P. M., being 1° 56′ south. The conjunction is not a close one, but will be interesting to observe, for the planets are near setting when it occurs. Jupiter will be west of Mars on the evening of the 26th, showing that the planets have passed each other on the celestial road.

The moon, two days before the first quarter, makes a close conjunction with Jupiter on the 23d, at 7 h. 43 m. P. M., being 6′ south. Moon and planet will be so close together that there will be an appulse, and they will seem to touch each other. The conjunction is visible, the time is convenient, and the celestial picture when moon and evening star seemingly touch each other will delight lovers of the beautiful in nature. It is to be hoped that the clouds will not conceal the scene from mortal view.

There was a similar appulse of the moon and Jupiter on August 13th, 1892. Two astronomers of Marseilles, France, witnessed the conjunction with the naked eye, between 7 o'clock and 8 o'clock in the morning, the time when the appulse occurred in that locality. Jupiter was seen just touching the northern horn of the moon, the phenomenon being plainly visible in full sunlight. The planet was then near perihelion, near opposition, and was observed in the pure, serene atmosphere of Southern Europe.

The right ascension of Jupiter on the 1st is 1 h. 0 m., his declination is 5° 2′ north, his diameter is 39″.6, and he is in the constellation Pisces.

Jupiter sets on the 1st at 0 h. 31 m. A. M. On the 31st he sets at 10 h. 47 m. P. M.

MARS

is evening star. He is fast fading into insignificance, but plays his part in one of the most interesting events of the month, his conjunction with Jupiter on the 25th, which has already been described. The planets after conjunction are no longer conspicuous companions.

The moon is in conjunction with Mars, two days before the first quarter, on the 23d, at 5 h. 37 m. P. M., being 1° 43′ south. The conjunction is visible, as it takes place an hour after sunset, and about two hours before the much closer conjunction of the moon and Jupiter. Mars, Jupiter, and the moon will be near neighbors on the evening of the 23d.

The right ascension of Mars on the 1st is 0 h. 12 m., his declination is 1° 6′ north, his diameter is 8″.2, and he is in the constellation Pisces.

Mars sets on the 1st at 11 h. 25 m. P. M. On the 31st he sets at 11 h. 8 m. P. M.

SATURN

is morning star. He is in quadrature with the sun, on the 2d, at 9 h. 21 m. A. M., being 90° west of the sun. He then rises at midnight, continuing to rise earlier every night, until on the last of the month he appears above the horizon at 10 o'clock, and will be in convenient position for observation. He is nearly as far as possible from Jupiter, being on the 2d 90° west of the sun, while Jupiter is 90° east of the sun on the 6th. Saturn is stationary on the 22d, and commences to retrograde or move westward.

The moon on the day of the last quarter is in conjunction with Saturn on the 9th at 3 h. 23 m. A. M., being 35′ south—a distance a little greater than the diameter of the moon. The conjunction is visible for observers who are willing to get up in the small hours to see it. The moon will occult Saturn to observers who are between the limiting parallels of 10° north and 86° south, and who also see her in her geocentric position.

The right ascension of Saturn on the 1st is 12 h. 50 m., his declination is 2° 43′ south, his diameter is 16″.4, and he is in the constellation Virgo.

Saturn rises on the 1st at 0 h. 9 m. A. M. On the 31st he rises at 10 h. 8 m. P. M.

VENUS

is morning star. The invisible chain that binds her to the sun is shortening, and, at the close of the month, she rises only an hour before him and will soon be lost in his light.

The moon, two days before her change, is in conjunction with Venus on the 15th at 2 h. 3 m. P. M., being 4° 47′ south. The conjunction is invisible, moon and planet being below the horizon.

The right ascension of Venus on the 1st is 16 h. 43 m., her declination is 21° 1′ south, her diameter is 12″.2, and she is in the constellation Scorpio.

Venus rises on the 1st at 5 h. 10 m. A. M. On the 31st she rises at 5 h. 58 m. A. M.

URANUS

is morning star. He is in quadrature with the sun on the 30th, at 0 h. 57 m. A. M., being 90° west of the sun. He is the third of the giant planets that reach quadrature during the month, Saturn and Jupiter preceding him.

The moon, two days before the last quarter, is in conjunction with Uranus on the 11th at 11 h. 28 m. A. M., being 1° 1′ south. The moon will occult Uranus for observers between the limiting parallels of 25° and 90° south, who see her as she would be seen from the center of the earth.

The right ascension of Uranus on the 1st is 14 h. 30 m., his declination is 14° 21′ south, his diameter is 3″.6, and he is in the constellation Libra.

Uranus rises on the 1st at 2 h. 33 m. A. M. On the 31st he rises at 0 h. 38 m. A. M.

NEPTUNE

is evening star. His right ascension on the 1st is 4 h. 31 m., his declination is 20° 15′ north, his diameter is 2″.6 and he is in the constellation Taurus.

Neptune sets on the 1st at 4 h. 56 m. A. M. On the 31st he sets at 2 h. 56 m. A. M.

Mercury, Venus, Saturn and Uranus are morning stars at the close of the month. Mars, Jupiter and Neptune are evening stars.

TWO FULL MOONS IN JANUARY.

The first full moon occurs on the 2d, at 8 h. 41 m. A. M. The second full moon makes its advent on the 31st at 9 h. 11 m. P. M., a little less than three hours before the month closes.

A Unique Mathematical Memory.

Jacques Inaudi, called by some "the modern Colburn," is the son of Piedmontese peasants, and he did not learn to read and write until about five years ago, when he was twenty years old. He learned the numbers from his brother by repeating them after him, and after that devised for himself methods of calculation that are peculiar to himself—that is to say, they differ from those in ordinary use. In problems of addition and subtraction he begins with the left hand numbers. This is stated to be the method of the Hindoo arithmeticians as well. The boyhood of this young man was passed in tending sheep, and while he was thus engaged his mind developed a passion for numbers—figures they cannot properly be called in this instance, for the processes are auditional, not visual, with Inaudi. Colburn and all prodigies in numerical memory who have been enabled to give any explanation of their mental work have stated that visualization was the basis of memory. Inaudi is rather disturbed than helped by the use of visible representations of the factors of proposed calculations. If this is true, and there is no reason to doubt it, Inaudi stands as the unique mnemonic prodigy of modern times, by reason of the fact that his powers are based upon the auditory faculty. Athough his memory for numbers is prodigious, his memory for words is quite poor. Neither prose nor poetry is well remembered by him, and melody not so well as by most persons. Color, form, time, and place do not fit in with his capacity, and it is simply incomprehensible to him, he says, that chess can be played blindfold.

According to Binet, in his recent paper in the *Revue des Deux Mondes*, the complexity of Inaudi's mental calculation and his rapidity are alike remarkable. Nearly all the proposed problems have many figures to add, multiply, or divide and to compare, and yet the time taken to announce the answer is extremely short. In a few seconds he adds numbers requiring ten numerals for their notation, and subtracts those requiring twenty; he rapidly finds the square or cube root of large numbers; if fractional parts of multiples are in question, the interval between question and answer is longer; he finds in a few seconds the sixth and seventh roots of true powers. He appears to do the mental part of ordinary examples in multiplication and division in less time than is required to enunciate their answers. He has been known to carry in memory a number expressed by twenty-two numerals for a week, although he had not been warned that he would be requested to repeat it. He can repeat a number forward or backward or give any section of it, as, for example, in millions or billions. At the end of a *seance* he can recite all the figures that have been mentioned up to the number of four hundred.

The head of Inaudi is large and his features are regular and surmounted by a forehead full and high as it is broad. At the Salpetriere a close anthropometric examination was made, under Professor Charcot, that revealed some few unimportant signs of degeneration. Inaudi converses agreeably and is skillful at cards and billiards. His character is marked by modesty and amiability, and his intelligence is that of an untrained but receptive person. It is quite a mistake to set him down as a mere calculating machine. All inquiry as to hereditary influences has resulted in a negative response. He comes from a family of peasants and was among peasants all his earlier years.—*N. Y. Med. Jour.*

Oxygen in the Purification of Coal Gas.

The main reason for the use of oxygen, says Mr. Harrison Veevers, is that the oxide of iron is revivified in the purifiers, without being exposed to the oxygen of the atmosphere, with its consequent expense of labor in emptying and filling the boxes, and turning over the oxide to get a thorough reoxidation. But, irrespective of this, there was a more serious matter to be considered. Every time a box was opened, there would be a loss of at least 1,000 cubic feet of gas, and, when replaced, an equal quantity of air would either be included or have to be expelled by a similar quantity of gas. In winter, a purifier frequently required changing ten times a week, entailing loss of either 20,000 cubic feet of gas or the inclusion of a quantity of air, which, by diminishing the illuminating power, had to be rectified by the use of a greater quantity of expensive cannel. After mature consideration, I advised the adoption of the system of the Brin Oxygen Company, and the board consented. A brief description of this method of obtaining a separation and imprisonment of oxygen from the atmosphere may not be superfluous. Air is drawn through a small purifier containing freshly burned lime, which desiccates the air, and also removes any carbonic acid gas, and to make assurance still more sure, it then passes through a vessel in which there is caustic soda. Being thus in an almost dry state, the air is forced through steel or iron retorts, set vertically, which contain caustic baryta in a spongy condition and are heated to a faint red heat (about 1350° Fahr.) The baryta, when heated and under pressure, has the property of absorbing the oxygen and rejecting the nitrogen, which escapes by means of a valve. It gives off this oxygen when a vacuum is created. This work of alternately arresting and removing the oxygen is performed in a most admirable manner by an automatic machine, which may be worked by steam or else by a gas engine. This machine can be regulated at will to suit the action of the baryta. The pressure in the retorts is 10 pounds and the vacuum 13 pounds. After being abstracted from the retorts, the oxygen is forced into a small holder on the Gadd & Mason principle, and thence conveyed to a meter regulated by a valve to admit 1 per cent of the quantity of gas made. The holder contains an amount equal to one day's demand, but I should advise one of double that capacity, or even larger. The proportion of oxygen in the holder is about 90 per cent.

The process may claim to have the following advantages:

1. Revivifying the oxide saves labor.
2. It also excludes the admission of nitrogen, and in consequence of this, less cannel is required to produce the necessary illuminating power.
3. Increased value of the spent oxide. It is impossible to get the strength of the spent oxide to 65 per cent without more frequent revivifying in the air, at a greater expenditure in labor than the value of the extra 15 per cent of the sulphur.
4. As the oxide abstracts more sulphur, less oxide is required annually.
5. Greater uniformity in the illuminating power of the gas, particularly in small or medium sized works.

IN our recent paragraph relating to Rife's hydraulic engine or ram the drive pipe was stated to be 18 inches; it should have been 8 inches.