JUPITER.

No planet of the system affords a more satisfactory study for the telescopic observer than the one that wins, for his giant size and beautiful appearance, the name of the Prince of Planets. The interest has been greatly increased during the last four years by marvelous changes that are taking place on his surface, all bearing testimony to the tremendous commotion that agitates his chaotic mass.

The most noteworthy markings on his disk at the present time may be classed in three divisions: the great red spot below his south equatorial belt, the rose-colored northern belt, and the luminous white spot near his equator. A great many astronomers have made careful notes of these markings, but those of Mr. Denning, of the Dun Echt Observatory, Bristol, England, commend themselves to special notice.

The red spot is the most familiarly known of the markings. It first appeared in the summer of 1878, nearly four years ago, and has continued ever since with scarcely perceptible change of form or color, though there is now a slackening in its motion which may be the precursor of dissolution. It is situated south of the south equatorial belt, and is parallel to it. Its dimensions are variously estimated at from twenty-two to twenty-nine thousand miles in breadth, and from seven to nine thousand miles in width. It is at least one-fourth of the diameter of Jupiter. Our globe could be rolled over the spot, and probably leave many thousand miles of space for the commencement of a second revolution. Its form is elliptical, the ends tapering to a point. At a view we had of it not long since, when passing off the disk, it resembled in form a huge cigar. The color is a lovely rose tint, in charming contrast with the soft, golden hue of the body of the planet. It has been a beautiful object for observation during the winter, even a two-inch telescope bringing it into view.

Many conjectures have been made as to its origin, which thus far rank simply as theories. Some observers consider it a rift in Jupiter's cloud-atmosphere; some think it reveals the red-hot planet beneath the clouds; and some perceive in the strange aspect the upheaval of a continent. The spot has been so long visible, and retained so unusual a condition of permanence, that careful computations of the time of its revolution have been made in the hope of determining the exact time of the planet's axial rotation. Four prominent astronomers reached a result within a second of the mean of their observations. The average was 9h. 55m. 34·5s.

The second study on the Jovian disk is the rosy belt in the northern hemisphere. Observers have actually seen the formation of this belt through the whole process. During the three closing months of 1880 there was an outbreak, and an outspread of a series of dusky spots, which were finally dispersed around the planet, and took the form of the rosy northern belt which still retains its permanence. The probability is that belt and spot are both the result of commotion in the cloud-atmosphere, which is supposed to surround the nucleus of the planet to the depth of many thousand miles.

The third and latest topic of interest on the face of our gigantic brother planet is the appearance of a number of bright spots or patches of light between the broad bands, known as the equatorial belts. These spots have been visible nearly as long as the great red spot, but did not at first attract as much attention. In 1880, however, it was discovered that they moved faster than the red spot, and interest was quickly concentrated on this remarkable phase. Several practiced observers computed the time of their rotation, and found the period five and a half minutes less than that of the red spot. One luminous spot stands out from the others as the most conspicuous of its class, and may still be seen, for a short time, before Jupiter ceases to be an object of present telescopic attraction. Observers have found great enjoyment in watching the white spot as it gained upon the red spot, making, by its independent motion, a whole circuit of Jupiter, relatively to the red spot, in forty-four and a half days. The diameter of the white spot is variable, sometimes reaching nearly five thousand miles. It seems also to be subject to a kind of periodicity, presenting a bright aspect for about fifty-six days, then becoming obscure as if by the passage of clouds, and then resuming its former brightness and moving with accelerated velocity

Mr. Denning has a theory in regard to this spot that deserves careful consideration. He thinks the spot is self-luminous, and emits light; that it is a projection from the real surface of the planet; that it is a permanent feature of the planet, and that it lies far below the level of the dusky belts. If future observations should confirm this theory then we may have a reliable means of ascertaining the period of Jupiter's rotation on his axis, which, according to the bright spot, is 9h. 50m.

It will be seen that Jupiter leaves our neighborhood in a cloud of glory. He will not be of much account as an object of observation for several months to come, as he draws closer to the sun. But when the beautiful summer mornings come, and he shines as a bright morning star, the telescopes of the whole world will be turned upon the beaming star. Intense will be the interest to find out if the luminous spot still shines near the southern equatorial belt, like a permanent projection from the planet; if the great red spot remains unchanged in the southern hemisphere; and if the rosy belt still circles below the northern pole; or if new rifts, belts, and spots are taking the place of those which have become familiar to terrestrial observers for the last three or four years.

All observation points to the inference that we are watching the process of world-making on our giant brother planet four hundred million miles away. Such as Jupiter is now the earth was millions of ages ago, when she was without form and void. Jupiter, thirteen hundred times the earth's size, takes a proportionately longer time to cool off. But, larger or smaller, the planets follow the same inevitable law, development, perfection, decay. Thus, in the perfection of our own planetary development, we may watch the slow process by which our magnificent brother parts with his heat, and takes on conditions that will eventuate in the rudest forms of vegetable and animal life. Millions of ages, as we count time, must pass before he reaches our stage of existence. When that time comes the earth will probably have fulfilled her mission in the economy of the universe, and will have taken her place as a dead world, as the moon has done before her, as the larger planets will do after her. Even the glorious sun must succumb to the same inexorable destiny, when, after the passage of countless ages, his fires cease to burn, the mysterious fuel that now sustains them being exhausted.

We are indebted to *Nature* for our drawings.

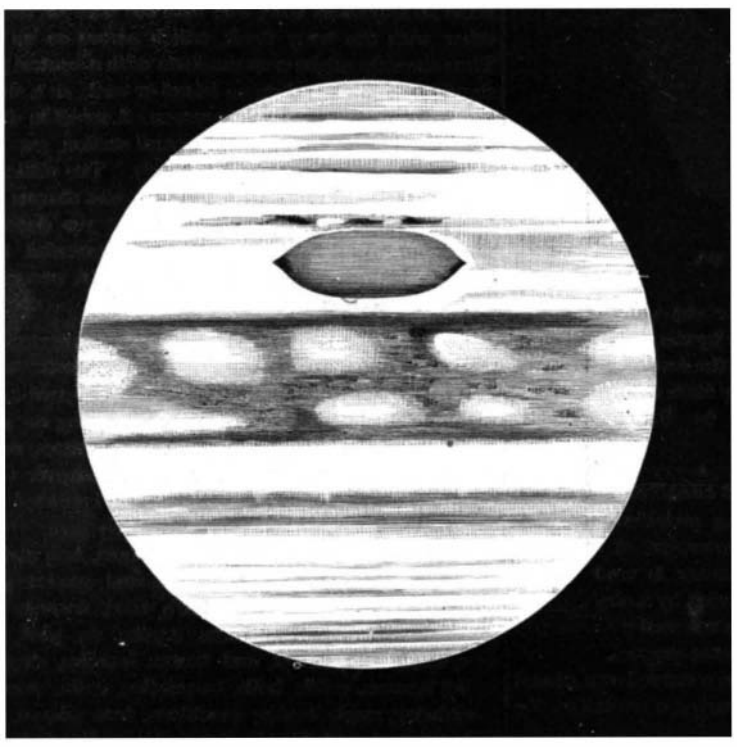

Fig. 1.—The great red spot in transit, December 7, 1881, 10h. 40m. There was a large white patch near the equator under the following side of the red spot. Immediately south of the red spot is a narrow belt with light and dark ovals upon it.

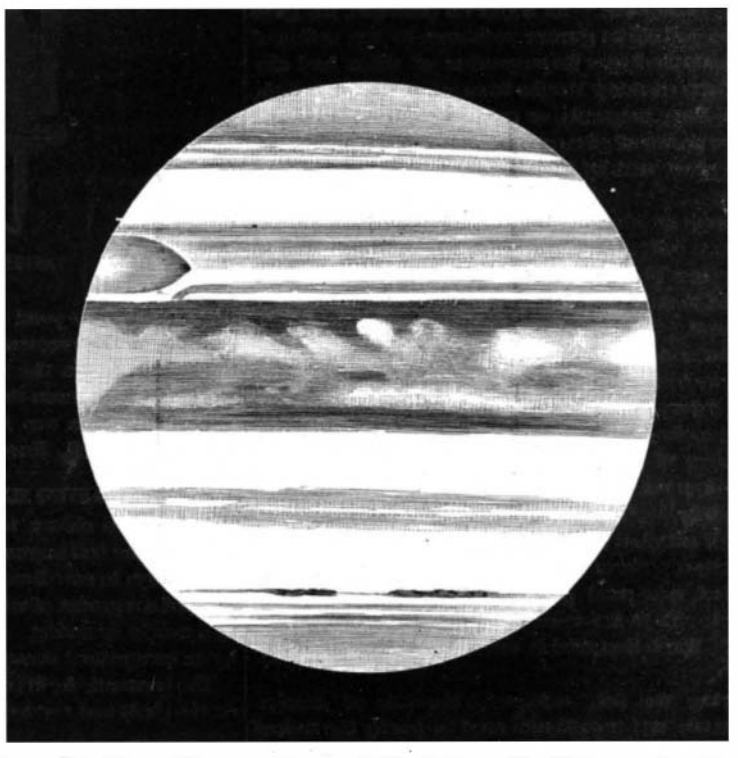

Fig. 2.—The bright spot in transit, December 18, 1881, 6h. 12m. The following side of the red spot is seen on the western limb. To the east of the light spot, and in nearly the same latitude, is a dark mass emerging from the great southern belt.

Fall of a Meteor.

On February 3 a remarkable fall of meteorites occurred in Transylvania. At Klausenburg an intense light suddenly flashed into view at 3:45 P.M. on that day, the sky being perfectly cloudless. The meteor was seen in the northeast part of the sky, and when it disappeared a white cloud was seen in its stead, which spread into a thin streak stretching from west to east. Soon afterward a loud report was heard. The next day the news arrived that near Mocs, about twenty-five miles to the east of Klausenburg, some meteorites had fallen; one of these weighs 35 kilogrammes, and penetrated 68 centimeters deep into the ground. Two other pieces were found near Olah Gyeres, and five others near Vajda Kamaras. Prof. Koch collected no less than sixty pieces of smaller dimensions near Gyulatelke, Visa, and Bare to the north of Mocs. The direction of the meteor was from northwest to southeast, to judge from the position of the fragments; the latter were scattered over a line of about fifteen miles in length.

Luminous Incomplete Combustion of Ether and other Substances.

BY W. H. PERKIN.

The author has observed, when evaporating ether in a shallow vessel on a strongly heated sand bath, on a dark evening, that a pale blue flame was floating about the surface of the sand. On referring to Gmelin's hand book, he found that this phenomenon had been observed by Sir H. Davy. Dobereiner and Bontigny have also put on record similar observations. In the present paper the author has pursued the investigation somewhat further, in order to produce the effect on a sufficiently large scale for lecture purposes. It can be shown by directing a jet of ether (preferably containing 5 to 10 per cent of alcohol) from a wash bottle on to a thick iron dish, heated nearly to dull redness. Ether enters into this luminous incomplete combustion at 260° C., much irritating vapor being produced; the temperature of the flame is so low that it does not char paper or inflame carbon disulphide. If the flame be confined, as by a paper chimney, the temperature soon rises and the ether enters into ordinary combustion. Another very effective method of exhibiting this blue flame is to suspend an iron ball heated nearly to a dull red heat over a dish containing filter paper moistened with ether, when a lambent blue flame surrounds the ball. In all cases a dark room is necessary. Spermaceti thrown on to a heated iron ball gives a similar result. Olive oil, linseed oil, white wax, paraffin, stearic acid, cleic acid, and acetic aldehyde gave blue flames when heated. Methyl and ethyl alcohols and propionic acid also give a feeble reaction. Benzene, toluene, naphthalin, anthracene, formic acid, acetic acid, benzoic acid, cinnamic acid, and phthalic acid gave no result. The phenomenon is probably analogous to that observed at ordinary temperatures with phosphorus. The author demonstrated with complete success the blue flame obtained as above described with ether and spermaceti.

The Blue Color of Water.

The *Photographic News* states that Mr. Aitken has been studying the blue color so characteristic of the Mediterranean and the Lake of Geneva, and his conclusions are embodied in a paper presented last month to the Royal Society. Mr. Aitken begins by saying that two solutions have been offered of this puzzling problem—the one explained the color as due to reflection of small suspended particles which did not reflect the lower rays of the spectrum, and the other that the color was the result of the absorbent action of the water itself upon the white light, before and after reflection of these particles. The latter theory Mr. Aitken holds to be the true one. The smaller the number of white reflecting particles the darker or greener the water appears to be, Mr. Aitken having been successful in turning the still green water of Lake Como into a bright blue by scattering finely-divided chalk in the middle of the lake.

Rubber Stamp Ink.

The following proportions are said to give an excellent ink, which, while not drying up on the pad, will yet not readily smear when not impressed upon the paper: Aniline red (violet), 90 grains; boiling distilled water, 1 ounce; glycerine, half a teaspoonful; treacle, half as much as glycerine. The crystals of the violet dye to be powdered and rubbed up with the boiling water, and the other ingredients stirred in.