

the Pomona and San Bernardino supply, which has been in successful operation for a few years. This enjoys the distinction of being "the first long-distance transmission system operated in the United States."

In the adjoining State of Oregon a very fine and successful plant has been in operation for some time at the Falls of the Willamette at Oregon City. The head of 40 feet gives a minimum capacity of 50,000 horse power; and the Portland General Electric Company have now in operation a hydraulic and electric installation of which one-fourth is in operation, which is to have a full capacity, when completed, of 12,800 horse power. The station building, as planned, will have a length parallel to the river of 364 feet. The hydraulic plant consists of Victor turbine wheels, arranged in pairs; each pair consisting of a 42 inch and a 60 inch wheel, running respectively at 200 and 100 revolutions per minute. The larger wheel is to be used during extreme high water as an auxiliary. The power plant will consist of twenty three-phase generators and two direct current generators, acting as exciters. The generators are set upon the floor of the station, the armatures revolving in a horizontal plane. They are over seven feet in diameter and two feet high. The armatures deliver current directly to the line, at a working potential of 6,000 volts effective pressure, without the intermediation of step-up transformers.

With a view to obtaining the best results the company selected the three-phase system of electric power transmission. The current when it reaches Portland, 14 3-10 miles distant, is transformed down to a potential of 400 volts.

In addition to lighting the city, which contains between 70,000 and 80,000 inhabitants, and operating the various motors, the Oregon City plant works an extensive system of trolley lines in the city on the west side of the river. It is proposed to carry the line across the river to East Portland and from there back to Oregon City. The whole plant is giving great satisfaction, and "its operation so far shows admirably, not only the effectiveness of the three-phase transmission system for general service, but also its feasibility."

The latest plant to be put in successful operation was that for the Folsom-Sacramento Power Transmission. By impounding the waters of the American River, and the construction of a complete plant of turbines and electric generators, the city of Sacramento has been furnished with a power and light supply that will meet its needs for many years to come.

The dam on the American River possesses an interesting feature in the shape of a long apron or "shutter," which pivots in a groove extending along the crest. This shutter is raised by hydraulic rams, and thereby the head of water in the river can be at any time increased. The hydraulic equipment consists of four pairs of 30 inch McCormick turbines, of 1,260 horse power each. They run under a head of 55 feet at 300 revolutions per minute; and they are directly coupled to the armature shafts of four 750 kilowatt three-phase General Electric generators. This is claimed to be the largest three-phase dynamo yet built. The height is 8 feet 8 1/2 inches and the base 11 feet by 8 feet 8 inches, and each weighs 59,897 pounds. At the electric power and light station in the city are three 250 kilowatt motors and the various electric railway generators and are lighting dynamos comprising the plant.

The largest consumer at present is the electric railway company, which operates 24 1/2 miles of single and 17 miles of double track.

The Southern Pacific Company, whose railroad shops are situated in the city, are negotiating for 900 horse power, to be utilized in place of their present steam power; and there is a proposal to erect a city drainage plant that shall be electrically driven.

The total length of pole line for transmission purposes is 21 1/2 miles.

#### THE HEAVENS IN NOVEMBER.

Venus, having attained her greatest brilliancy as a morning star on the 25th of October, will continue to withdraw from the neighborhood of the sun until the end of November. Last summer, when she dazzled the eyes of her admirers in the western sky, she was approaching the earth. Henceforth she will recede from it. She passed nearly between the sun and the earth on the 19th of September. At this time, when the two globes were at their nearest approach to one another and when Venus was hidden from the eyes of terrestrial star gazers by the blaze of sunlight surrounding her, the astronomers of that planet had an opportunity to witness the phenomenon of a solar eclipse on the earth. Our globe must then have appeared to them as a much more brilliant planet than Venus ever is for us, and even the moon would be clearly visible to them. Watching with telescopes, they might have seen the moon swinging into line between the sun and earth, and then her round black shadow creeping across the Antarctic snows and the Southern Pacific Ocean.

But some one may say, "What's the use of talking about inhabitants of Venus? Perhaps there are none."

Just so; but then we, ourselves, become, in a cer-

tain sense, inhabitants of Venus when science enables us to place ourselves in imagination upon that planet and to see with the eye of the mind the things that would there be visible. Man does not live by bread alone; neither, if he opens the wings of his intelligence, does he dwell only on the earth.

In regard to the habitability of Venus, I may remark that since I wrote in August last I have talked with the Italian astronomer Schiaparelli at Milan, and he has assured me that his latest observations of Venus absolutely confirm him in the opinion that the rotation of that planet is exceedingly slow, and probably exactly coincident in time with the period of its revolution around the sun. Venus, then (if Schiaparelli is right), has perpetual day on one side and unending night on the other. The bearing of such a condition of things on the question of habitability is too evident to need pointing out, but I have not room to discuss it here. In the meantime Venus as a morning star is worth getting up early to see, even though her splendor is fading.

Nearly at the same time when Venus reached her greatest splendor in October, little Mercury was swiftly passing between the sun and the earth, as if in chase of his greater sister. At the beginning of November a sharp eye might detect him emerging from the rays of the morning sun. The leash of gravitation by which his solar master restrains him is not long enough to permit him to overtake Venus, but on the morning of the 10th he will be at his greatest elongation from the sun, straining, as it were, to break his bonds, and then will be a good time for early risers to catch a glimpse of him.

Mars, Saturn and Uranus are all assembled near the sun in the morning sky in the constellation Libra. Mars and Saturn will be in conjunction on the 16th, an evil aspect, according to the astrologers, since both of these planets are "malefics," and very desperate malefics, too. Let us not, however, be alarmed. The temper of Mars has improved since he has been the object of so much flattering attention on the part of the inhabitants of the earth, while Saturn must surely be too busy keeping his rings of clashing meteors in order to trouble himself about such small affairs as ours.

On the 18th there will be a close conjunction of Mars and the star Alpha Libræ; on the 20th a conjunction of Mercury and Saturn; on the 23d a conjunction of Mercury and Mars, and on the 25th a conjunction of Mercury and Uranus. These conjunctions are certain to play a conspicuous part in the horoscopes of the astrologers, who, some readers may be surprised to learn, did not disappear with the dark ages, but flourish in large numbers to-day, and find thousands of credulous dupes.

Jupiter, near the borders of Cancer and Leo, rises between two and three hours before midnight, during November, and is a brilliant object in the small hours of the morning. His belts of varying shapes and hues are not less beautiful than they were last spring, while the phenomena of his circling satellites are never without interest to the possessor of a telescope.

The month opens with a full moon, the phase occurring on the evening of the 2d in Aries. The moon reaches last quarter in Leo on the evening of the 9th, and becomes new moon in Libra on the 16th about midday, first quarter following in Aquarius early on the morning of the 24th.

The lunar planetary conjunctions occur as follows: With Neptune on the 5th, with Jupiter on the 9th, with Venus on the 13th, with Mercury on the 15th, with Mars on the 15th, with Saturn on the 15th, and with Uranus on the 16th. The moon is nearest the earth on the 13th and farthest from it on the 25th.

Among the double stars that are well placed this month are  $\gamma$  Arietis, the first discovered double, magnitudes 4 and 4 1/2, distance 8";  $\epsilon$  Arietis, magnitudes 4 1/2 and 6, distance 1".5;  $\eta$  Cassiopeæ, magnitudes 4 and 7 1/2, distance 5", colors yellow and purple;  $\tau$  Cassiopeæ, triple, magnitudes 4, 7 and 8, distances 1".5 and 9"; and  $\gamma$  Andromedæ, also triple, although ordinary telescopes cannot at present show the third star. The two principal stars are of magnitudes 3 and 6, distance 10". Their contrast of color, gold and blue, is very decided and beautiful. GARRETT P. SERVISS.

#### The New York Fruit Market.

The first Almeria grapes of the season have arrived, and 1,542 barrels have been sold at the wholesale auction recently. The prices ranged from \$3 to \$6.50 a barrel, the average for the entire sale being \$4.65. This sale is ten days earlier than the first offering of last year. The fruit was not of the best quality, though the prices were high. It is estimated that 90,000 barrels will constitute the total shipment to the United States this year, against 125,000 barrels last season. The only oranges now to be had, excepting a few from Sicily, are those from Jamaica, and the fruit is of fair quality, considering its earliness. Several car load of Albemarle pippins from Virginia have already been shipped from this port to England.

Other American apples now in European markets are Baldwins, Greenings, Kings, Northern Spies and

Ben Davis, the highest grades selling there for \$2 to \$6 a barrel. Although 17,845 barrels of cranberries have thus far reached this city, besides 3,082 crates, twice as many as were received up to the same time last year, the demand for this fruit has been active enough to force high prices. The excessive heat during September is said to have injured the Cape Cod crop, and frosts have more recently damaged the New Jersey cranberry bogs, so that it is estimated that the total yield will not more than equal the short crop of last season. Extra large varieties from Cape Cod command \$8 a barrel.

The season for California fruits is drawing to a close. The last plums, prunes and peaches have been received. Pears are scarce, and will continue to be so during the winter, since much of this fruit has been forwarded to England. One hundred carloads of California fruits have crossed the ocean during the summer and autumn, and Clairgeau, Duchesse, Easter Beurre, Comice and Glout Moreau pears now command \$3.50 to \$5 a box at wholesale in Great Britain; prices for the same sorts here range from \$1.85 to \$3.20 a box. Grapes constituted the bulk of thirty-seven car loads of Western fruits sold in this city recently. Chestnuts, which early in the week sold for \$7.50 to \$8 a barrel, fell to \$4 by Saturday, and hickory nuts were plentiful at seventy-five cents and \$1 a barrel.—Garden and Forest.

#### Cycle Notes.

Bicycles are taxed in Belgium, but the proceeds of the bicycle tax are used for the improvement of the streets and highways.

A number of wheelmen with guns strapped across their backs may be seen speeding over the roads almost daily in the neighborhood of Manchester, N. H. They use the bicycle to reach the outlying woods in quest of game.

In Montreal, Canada, the law provides that every bicycle must be equipped with a brake.

A Chicago inventor has devised a three compartment pneumatic bicycle tire which, while not unpuncturable, still reduces the liability of injury to a minimum, because if the rubber in one of the compartments is punctured, the other two are still sufficient to carry the rider and keep the tire in cylindrical form. The partitions are arranged spirally. The tire is inflated through three separate tubes, each chamber requiring separate pumping.

In many bicycles it is a difficult matter to flush the bearings of the crank shaft with kerosene, owing to the absence of or smallness of the oil hole; they can, however, be admirably flushed in most bicycles by removing the saddle post and pouring kerosene down the frame. The crank shaft should of course be rapidly rotated and the bicycle inclined from side to side.

Women bicyclists of Belding, Or., wear bloomers and a short skirt while riding through the streets of the town, but as soon as they strike the city line they doff the skirt, strap it to the handle bar, and ride unencumbered through the country districts. When they reach the city line on their return, they don the skirt again.

The street railroad companies of Kansas City have decided to allow bicycles to be carried on their cars when the wheelmen have their tires punctured or their wheels otherwise injured so that they would be obliged to walk.

For a long time the Kings County Elevated Railroad, of Brooklyn, has been carrying bicycles, and the road is well patronized by wheelmen, so that sometimes on Sundays special trains are provided for their accommodation. The charge for bicycles is 10 cents.

Many of the Western cities have passed absurd ordinances curtailing the privileges of wheelmen. For instance, one Wisconsin city has passed an ordinance which prohibits riders from leaning their machines against hitching posts.

The first annual convention of the United States Military Wheelmen was held at the Broadway Central Hotel New York City, October 15. The object of holding the convention was to invite all the officers and soldiers and ex-officers and soldiers of the regular or volunteer armies of the United States or of the National Guards of the various States who are wheelmen to meet together and express their views in regard to the utility of the bicycle for military maneuvers.

The spread of the bicycle fever has had a marked effect on the rubber trade. A well known rubber dealer states that in the past eighteen months \$5,000,000 worth of crude rubber has been purchased by tire makers.

An Oregon paper cites an instance of what it considers the crowning act in the degradation of the horse. A man in Dalles owns a horse and also a bicycle, and the bicycle is the latest love. For it he has neglected the horse until the latter has grown fat and lazy for want of exercise. His stableman said the horse really must have exercise, so the owner ties it by a long halter to the handle of his bicycle and trundles along three or four miles a day, leading the horse ignominiously behind him.