POSITION OF THE PLANETS IN APRIL.

VENUS

is evening star. She ranks first on the planetary annals of April, for her marvelous beauty and brilliancy and the interesting incidents that mark her course. She is in perihelion on the 2d at 3 h. A. M., but her orbit is so nearly circular that she is but 470,000 miles nearer the sun in perihelion than in aphelion, a short distance in celestial measurement. The most important event in her career is her arrival at greatest eastern elongation, on the 30th, at 0 h. 15 m. A. M., when she is 45° 34′ east of the sun. This, in one aspect, is the culmination of her course as evening star, for, though she continues to come nearer to the earth, and increase in size and luster, she then reaches the end of the chain that holds her to the sun. Not a second of arc farther east of the sun can she go, but bound to him by irrevocable law, she remains stationary for a short time, and then, with quickened pace, retraces her steps toward the great central luminary. Observers will note the change in her perceptible approach to the sun after elongation, and in the shorter time she remains above the horizon after sunset. A minor event on the April record is her conjunction with Neptune on the 12th at 0 h. 20 m. P. M., when she is 4° 18′ north of Neptune, one of the phenomena to be seen in the mind's eye.

The moon, when three days old, makes a very close conjunction with Venus on the 29th, at midnight, being 3′ south. Crescent and planet will be below the horizon at the time of conjunction, but they will be near enough together to form a charming picture on the evening of the 29th. The conjunction becomes an occultation to observers who see the moon in her geocentric position, or as she would be seen from the center of the earth, and are also between the limiting parallels 41° north and 23° south.

The right ascension of Venus on the 1st is 3 h. 32 m., her declination is 21° 17′ north, her diameter is 18″.2, and she is in the constellation Taurus.

Venus sets on the 1st at 10 h. 5 m. P. M. On the 30th she sets at 10 h. 46 m. P. M.

URANUS

is morning star until the 23d, and then evening star. He is in opposition with the sun on the 23d, at 1 h. 49 m. P. M. The conditions are fine for the study of this planet, now easily visible to the naked eye as a faint star of the sixth magnitude, 15° east or to the left of Spica, and a little to the right or west of Lambda Virginis, a star of the fifth magnitude. When the position of Uranus is once established, it will be easy to follow his course on moonless nights for several months to come. An opera glass will aid the observer, and so will patience and a practiced eye. A small telescope will be more satisfactory, for it will bring out the planet as a disk of a delicate green color.

The moon *occults* Uranus on the 12th. The immersion of the planet takes place at 11 h. 56 m. P. M., and the emersion occurs on the 13th at 1 h. 22 m. A. M., the occultation lasting 1 h. 26 m. The phenomenon will be very interesting, and must be observed with the telescope, in which the moon, soon after the full, and the little planet will present a charming picture.

The right ascension of Uranus on the 1st is 14 h. 11 m., his declination is 12° 41′ south, his diameter is 3″.8, and he is in the constellation Virgo.

Uranus rises on the 1st at 8 h. 8 m. P. M. On the 30th he sets at 4 h. 41 m. A. M.

MERCURY

is evening star until the 19th, and then morning star. He is in inferior conjunction with the sun on the 19th at 11 h. 1 m. A. M., when he ceases to be evening star, and appears on the sun's western side to commence his short course as morning star. Mercury continues to be visible to the naked eye during the first week of the month. He will be found farther north each evening, and at about the same distance, 9° northeast of the sunset point, as at the time of greatest elongation.

The moon, the day before the full, is in conjunction with Mercury, on the 25th, at 10 h. 1 m. P. M., being 1° 52′ south.

The right ascension of Mercury on the 1st, at noon, is 1 h. 53 m., his declination is 14° 30′ north, his diameter is 7″.8, and he is in the constellation Aries.

Mercury sets on the 1st at 7 h. 58 m. P. M. On the 30th he sets at 4 h. 21 m. A. M.

SATURN

is evening star. He is a beautiful object in the east in the early evening, as he makes his way toward the zenith, while his more brilliant rival, Venus, is descending in the east, too far distant to interfere with his lesser light. This is the case on the 1st of the month, for then Saturn is on the meridian about 11 o'clock, and Venus sets about 10 o'clock. It is different at the close of the month, when Saturn is on the meridian at 9 o'clock, and Venus sets about half-past 10 o'clock. The two evening stars will then shine in the western sky until Venus disappears.

The moon, three days before the full, is in conjunction with Saturn, on the 9th, at 3 h. 36 m. P. M., being 1° 49′ north.

The right ascension of Saturn on the 1st, at noon, is 11 h. 48 m., his declination is 4° 5′ north, his diameter is 18″.4, and he is in the constellation Virgo.

Saturn sets on the 1st at 5 h. 13 m. A. M. On the 30th he sets at 3 h. 15 m. A. M.

MARS

is morning star. There is nothing of special interest in his April course. Observers who desire to follow his course will find him on the first part of the month shining as a small ruddy star a short distance north of the dipper in Sagittarius, rising about half-past 1 o'clock in the morning.

The moon is in conjunction with Mars on the 19th, at 6 h. 25 m. A. M., being 3° 44′ south.

The right ascension of Mars on the 1st is 18 h. 51 m., his declination is 23° 28′ south, his diameter is 9″.0, and he is in the constellation Sagittarius.

Mars rises on the 1st at 1 h. 29 m. A. M. On the 30th he rises at 0 h. 37 m. A. M.

JUPITER

is morning star. He is still too near the sun to be visible. His advance in northern declination will bring him into more favorable conditions for observation, for several years to come, which is a hopeful state of affairs for astronomers who make a specialty of the study of the Jovian disk.

The right ascension of Jupiter on the 1st is 0 h. 16 m., his declination is 0° 30′ north, his diameter is 31″.6, and he is in the constellation Pisces.

Jupiter rises on the 1st at 5 h. 25 m. A. M. On the 30th he rises at 3 h. 48 m. A. M.

NEPTUNE

is evening star. His right ascension on the 1st is 4 h. 21 m., his declination is 19° 56′ north, his diameter is 2″.5, and he is in the constellation Taurus.

Neptune sets on the 1st at 10 h. 49 m. P. M. On the 30th he sets at 8 h. 59 m. P. M.

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

Yearling Fishes.

Two and a half millions of yearling fishes were planted last year, says the *Washington Star*, in the waters of the United States by the Fish Commission. This statement is more remarkable than it may seem. Up to 1886, all the fishes artificially hatched by the government were turned into the rivers and lakes to shift for themselves, as soon as they were out of the eggs. Consequently nearly all of them were devoured, and out of every thousand young fry but few were expected to survive and reach maturity. Five years ago a first experiment was made with the planting of 13,000 "fingerlings," that is, fishes which had attained a season's growth.

Before long all the fishes artificially propagated for planting in this country will be allowed to get a year's growth before they are let loose. It has been found that one acre of water will accommodate 500,000 fry from the time they are hatched to the condition of fingerlings. Under such circumstances 50 per cent of the baby fishes survive the season, at the end of which they are able to take care of themselves and have passed the danger point. In other words, when permitted to escape and look out for themselves in the streams or elsewhere, they mostly escape destruction and reach mature fishhood.

Pretty soon this plan will be exclusively pursued in the propagation of shad for stocking the rivers. Conveniently near to each stream will be established suitable ponds. The fish commission will simply hatch out the fry and send them immediately to these preserves, where they will be permitted to grow to a finger's length before they are let go. Fishes only grow during the warm season, so that at the end of four months, when hatched in spring, they are yearlings in size. A pond 100 acres in extent will accommodate 50,000,000 of shad fry, and at the end of 120 days communication with the river can be opened and 25,000,000 little fishes will swim merrily away, to return in future years of a marketable size.

Unlimited quantities of shad eggs are always obtainable in the season, and as many millions of them can be hatched in glass jars as are desired. Thus the result to be secured by artificial culture in any river is only limited by the pond area used. A majority of the fingerlings let go will certainly live to grow up and swell the schools which annually visit the streams for spawning. Exactly the same proposition applies to other kinds of fishes. The fish commission is at present rearing trout and salmon on a like principle and with similar results. A large pond is now being prepared at Gloucester, Mass., for stocking with newly hatched codfish, which will be put into the sea as yearlings. In this way it is hoped that the catch of this valuable food fish along the New England coast will be greatly increased after a while.

The same method would be tried with lobsters, but for the fact that these pugnacious crustaceans cannot be made to grow up together peaceably. You put a dozen newly hatched specimens into an aquarium, and within a few days there will be only one—a large, fat, and promising youngster. He has eaten all the rest. Therefore, baby lobsters have to be let loose in the ocean when they are just out of the egg, and in this plan not much profit is found, because they are quickly gobbled by fishes. The fish commission is hatching 5,000,000 of young lobsters yearly. Once upon a time, not many years ago, 25 pound lobsters were not infrequently captured, and there is record of 40 pound specimens, but such giants are no longer seen, because they do not have a chance to get very big before they are taken by the fishermen.

One of the most profitable branches of the fish commission's work consists in stocking the streams, ponds, and lakes all over the West with the native fishes of the Mississippi Valley. They are taken in great quantities in puddles big and small, where they are left by the retreating waters after the floods, and are shipped alive to various parts of the Union. Thus black bass, rock bass, pike, perch, crappies, spotted catfish, and other species are being distributed throughout the United States very plentifully. Trout of six kinds have recently been introduced successfully to the Yellowstone Park region—a territory as big as the State of Rhode Island, which has hitherto been practically bare of fish.

An Improved Form of Induction Coil.

BY H. N. WARREN, RESEARCH ANALYST.

The original construction of induction coils known as the continuous wind, constituting what is known as the secondary coil, has been of late superseded by what is termed the segment wind, differing both as regards its insulation and also in its effects when compared with the former system. The following description of a machine of this construction will afford a brief idea of the benefits derived over other systems, when every advantage is taken in manufacturing an article of this description to avoid, if possible, the use of impure elements:

In this case the primary core was prepared by precipitating pure oxide of iron, igniting, and reducing it in a current of hydrogen gas; afterward, fusing and forging the same. Of this substance, 10 lb. of wire, about the thickness of a wax match and a foot and a half in length, was selected, a pure iron rod composed of the same substance also passing through the center. This core was covered with several layers of paraffined silk, over which was wound 4 lb. of very thick insulated copper wire, each layer being carefully insulated; the whole being inclosed, save the extremities, in a thick ebonite tube. Upon this was mounted the secondary, consisting of 25 lb. of No. 22 double silk-covered wire; on the whole this may be regarded as a thick wire, but the strength afforded, both as regards the spark obtained and also the amount of current allowed, was well merited. The secondary was composed of 52 segments, each separated from each other by mica plates; the whole being coated with paraffin to about 2 inches in depth, being further cased in ebonite. To the contact breaker of the machine, in order to absorb the spark, were connected 500 sheets of copper foil, each being insulated by paraffined silk and protected in the usual manner. The machine, as now constructed, required five Bunsen quarts to urge it to its full. The spark thus obtained, which was nearly 15 inches in length, was the most intense I have ever seen. In some instances, the sudden discharge was equivalent to the report of a rifle, affording a constant stream of thick fire resembling lightning. The supply of ozone liberated was very considerable, almost immediately bleaching cotton fabrics when brought near the same in a moist condition; two dozen large vacuum tubes, 2 feet long and upward, were instantaneously lighted; and deal boards, to the thickness of half an inch, were readily pierced; almost every elementary substance was speedily volatilized when brought in contact with the spark, and their spectra thus revealed by the aid of that instrument.—*Chem. News.*

A New Storage Battery Car.

The Woodland Avenue and West Side Street Railroad Company, of Cleveland, O., has been testing a new storage battery car, with the view of equipping its lines with the same should the test prove successful. The car which is being tested is one manufactured by the Ford & Washburn Electric Company, of Cleveland, and is called the "Ideal." It measures 21 ft. inside over all and is equipped with 180 cells, which are placed under the seats, serving to operate a forty horse power Ford & Washburn motor. One charge, it is stated, is sufficient for fifty miles on an ordinary track. A recent issue of the Cleveland *World*, referring to the new car, had the following:

"Supt. Mulhern, of the Woodland Avenue and West Side Street Railroad Company, is very much pleased with the system, and says that it is very probable that it will be adopted by the company. The new car will be run on the Woodland line among the other cars for a few weeks as a further test. It will make all the regular stops to pick up and let off passengers, and if this proves satisfactory, a large order for cars will at once be placed with the company."