

THE HEAVENS IN AUGUST.

BY HENRY NORRIS RUSSELL, PH.D.

Two eclipses occur during the present month, both of which are visible in the United States, though neither of them is observable on the Atlantic coast.

On the morning of August 4 there is a total eclipse of the moon. She first enters the earth's shadow at 6:10 A. M. (Eastern standard time). At 7:09 she is completely immersed in it, and does not begin to come out till 8:51, nor get quite clear till 9:50.

As the moon sets at 5 A. M., none of these phenomena will be visible in New York; but when we transform our Eastern standard time into Mountain or Pacific time, we see that dwellers in the Rocky Mountains will see the moon set partially eclipsed, while the inhabitants of the Pacific coast will be able to watch the complete disappearance of the moon into the shadow before she goes down.

The whole eclipse will be visible throughout the Pacific, in Alaska and in the Philippines, and its later phases in China and as far as India.

This eclipse is remarkable for its long duration, which is due to the fact that the moon goes almost exactly through the center of the earth's shadow, and so crosses it where it is broadest.

On the afternoon of August 19 there is a partial eclipse of the sun, which is visible in the northwestern corner of the United States, in Washington, Oregon, and Idaho, while in Montana the sun sets eclipsed. Only a small portion of the northern edge of the sun is obscured.

The eclipse is also visible in British Columbia and in most of Alaska, and throughout the polar regions generally.

THE HEAVENS.

Our map shows the principal evening constellations. The very bright white star almost overhead is Vega, the brightest in the Lyre. The star  $\beta$  Lyrae, southeast of it, is a remarkable variable, which at brightest is just about equal to its neighbor,  $\gamma$ , but runs down to about one-third of its brightness every twelve days, with a less pronounced minimum between times. A few nights' watching of the two stars will satisfy any one of its variability.

The small star shown on the map to the northeast of Vega is double, easily seen with a field-glass. A fair-sized telescope shows that each of the pair is again double. Below Lyra is Cygnus, the Swan, a very fine constellation. The cross formed by the five stars  $\alpha$ ,  $\delta$ ,  $\gamma$ ,  $\epsilon$ , and  $\beta$  cannot be mistaken for anything else in the heavens. Between  $\alpha$  and  $\delta$  are two small stars, of

which the southernmost is a fine, but difficult, naked-eye double, while  $\beta$  Cygni is one of the finest telescopic double stars in the whole sky.

South of Cygnus is Aquila, the Eagle, with the first-magnitude star Altair. The line of three stars of which Altair is the middle points downward toward the two principal stars of Capricornus, the Sea Goat, both of which are double, one to the naked eye and the other to a field-glass. Pegasus, Andromeda, and Aquarius (the Water-Bearer) are all rising, but can be seen better later on.

In the south we can see Sagittarius, the Archer, and Scorpio, the Scorpion. The latter is very well shown on the map, but the former is by no means satisfactorily delineated, as several stars which are pretty conspicuous to the naked eye have been left out. Its most conspicuous figure is the Milk Dipper, composed of the stars  $\lambda$ ,  $\zeta$ , and  $\sigma$ , with two others. Lying as it does right in the Milky Way, it can easily be found without the map.

The extensive groups of the Serpent and the Serpent-Bearer lie higher up, and above them, right overhead, is Hercules. To the westward is the Northern Crown (so called because there is a Southern Crown, south of Sagittarius). Below this is Boötes, the Herdsman, with the bright star Arcturus. Virgo and

Libra are low in the southwest. The Great Bear fills almost all the northwestern sky. Of the circumpolar constellations, the Dragon and the Little Bear are above the Pole on the left. Cepheus and Cassiopeia are on the right, and the inconspicuous Camelopard is below them.

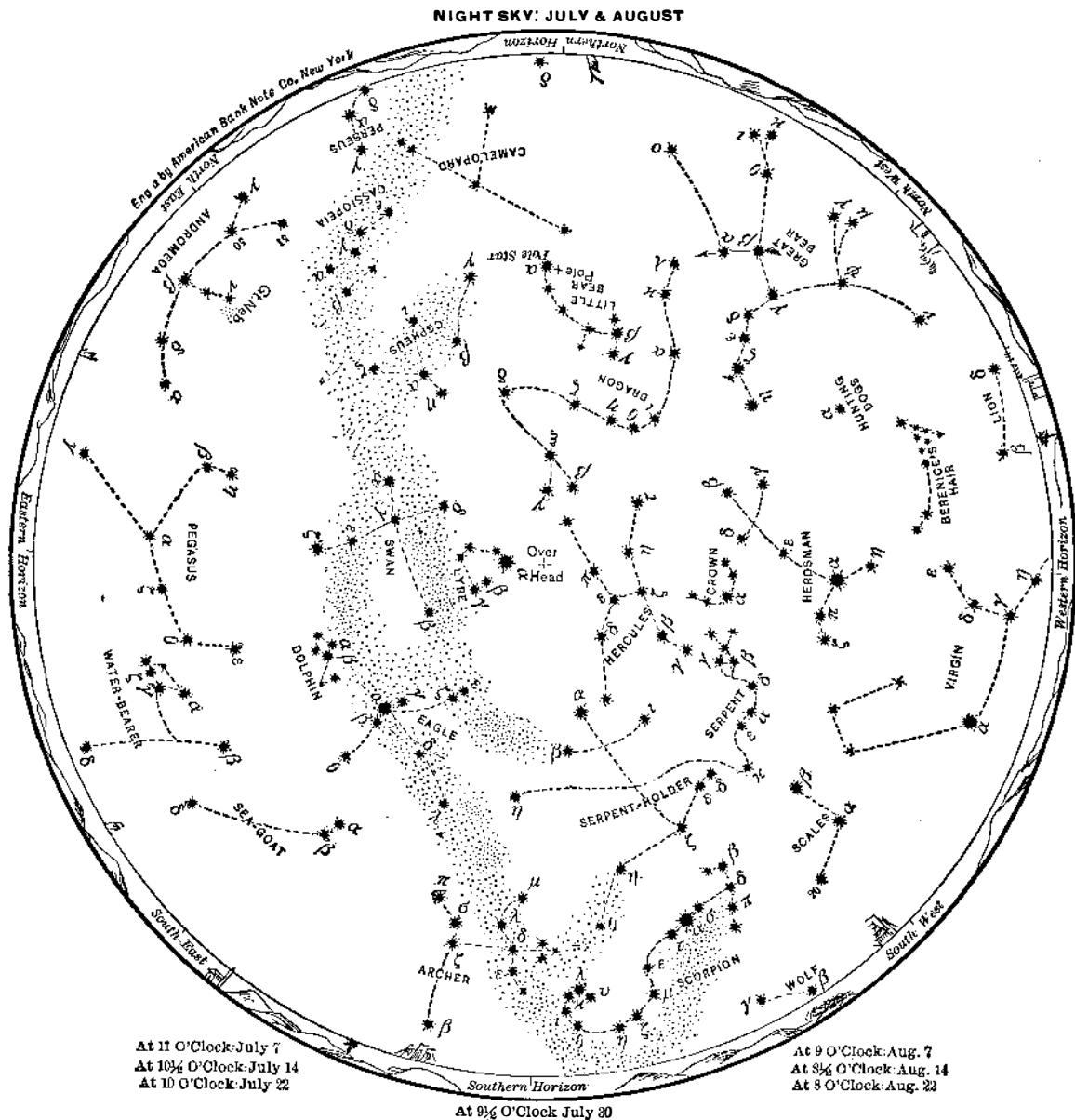
THE PLANETS.

Mercury is evening star before the 12th, and morning star after that date, and is well visible only in the last week of the month, when he rises about 4 A. M. He is in Cancer, far from any conspicuous star, and is himself uncommonly bright, and so should be easily seen.

Venus is evening star, setting at about 8:30 P. M. all through the month. Mars is morning star, but is still too near the sun to be easily seen.

Jupiter is likewise a morning star, and rises about 1:30 A. M. in the middle of the month. Saturn is in Aquarius, approaching opposition, and rises at 8 P. M. on the 15th.

Uranus is in Sagittarius, and can easily be found by aid of the star  $\lambda$  Sagittarii at the end of the handle of the Milk Dipper. Early in the month it is exactly due north of this star, at a distance of a little less than two degrees. It is moving westward, but covers only about half a degree during the month, and soon



In the map, stars of the first magnitude are eight-pointed; second magnitude, six-pointed; third magnitude, five-pointed; fourth magnitude (a few), four-pointed; fifth magnitude (very few), three-pointed, counting the points only as shown in the solid outline, without the intermediate lines signifying star rays.

after begins to retrace its path. Neptune is in Gemini, rising at about 2 P. M.

THE MOON.

Full moon occurs at 8 A. M. on the 4th, last quarter at 10 P. M. on the 11th, new moon at 8 P. M. on the 19th, and first quarter at 8 P. M. on the 26th. The moon is nearest us on the 27th, and farthest away on the 12th. She is in conjunction with Uranus on the 1st, Saturn on the 6th, Jupiter on the 15th, Neptune on the 16th, Mercury and Mars on the 18th, Venus on the 23d, and Uranus again on the 29th.

Princeton Observatory.

THE ORIGINAL SELDEN GASOLINE AUTOMOBILE AND ITS BEARING ON THE PATENT LITIGATION.

Recently, in the course of the trial of the famous Selden patent case (this patent is supposed to be a basic one covering the use of a clutch between the engine and the road wheels of a gasoline automobile) the plaintiff placed on exhibition the original machine said to have been constructed by George B. Selden in 1877. This primitive automobile has a horizontal 3-cylinder engine capable of developing only half a horsepower and of driving the car 10 miles an hour. In commenting upon it, counsel for the defendant claimed that all there was in the present machine that was

original in the Selden car in 1879, when Mr. Selden filed his application, was the casting of the three working cylinders, the three air cylinders, the crankcase in one casting, the crankshaft, one piston in one working cylinder and one air cylinder, and the yoke connection of that piston to one of the cranks. Everything else was new, and does not date back earlier than about last October.

Ignition in the original engine was effected by a constant flame burning on the gauze in the combustion chamber. This small flame was fed by air from the air tank through a little hole made in the air inlet valve, which little hole was always open. The charge burned as it came in and passed through this gauze on which this flame was burning. In the exhibition the other day, according to Mr. Selden's testimony, he used electricity to light that flame, and said he might continue a constant sparking to insure the flame not going out. The electrical ignition was a mere substitute for lighting this flame through the exhaust pipe after the cylinder was filled with combustible. The electrical ignition was by sparks passing between an insulated terminal and the wire gauze, so that the return line of the current was through the engine body. This engine will not develop over an effective half horse-power on driving the car at ten miles per hour with 20 pounds traction.

It is doubtful if, from the patent specifications together with what was known in the art before 1879, an operative engine and car could have been made without instructions which are not found in the specifications.

An obscure line in the drawing of the patent is interpreted without a word in the specifications to say what it is or what it will do, as a so-called wicket valve, which is said by Mr. Selden in his testimony to be novel with him. No one from the patent could know what it was or what it would do, nor would anything be found in the art in that relation which would give any light on that subject.

The patent is therefore misleading, as the engine would, according to Mr. Selden's testimony, not operate effectively without the presence of that valve, which is not described and can only be considered illustrated by a forced interpretation of the drawing, which no one would guess from looking at it. This is more than confirmed by the fact that Mr. Bentley, the complainant's expert, in his testimony in the case, interpreted the lines as the gauze and nothing else. He did not discover that there was any valve illustrated in the drawing in that position. Mr. Selden has testified that this valve is an essential feature. If this is so, he has withheld from the public knowledge regarding an essential feature in his patent, and has not disclosed completely his real invention. According to the law this alone would invalidate the patent.

The raisin production of California for the last decade has been about 895,000,000 pounds, an annual average of 89,500,000 pounds. The shipments of California-grown grapes to States farther east for the last ten years have amounted to 10,482 cars, or about 251,568,000 pounds, an annual average of 25,156,000 pounds. In 1903, on account of the short crop in the Eastern States, the shipments were greatly increased there having been over 1,800 cars shipped. In 1904 more than 1,450 cars were shipped. About 50 per cent of the grape crop in California is converted into wine and 35 per cent into raisins, while 15 per cent is shipped as fresh grapes.

On July 13 Loring Coes died in Worcester, Mass., at the age of ninety-four. He was the inventor of the hand-screw wrench which is named after him. Despite his great age, he was still actively engaged in manufacturing.