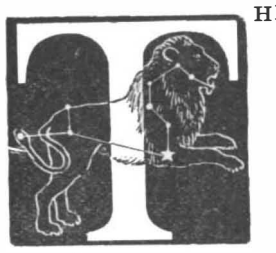
THE HEAVENS IN APRIL.

BY HENRY NORRIS RUSSELL, PH.D.



THE constellation Leo (which is illustrated in our initial letter) is one of the easiest to recognize in all the heavens. There is nothing else in the sky like the familiar "Sickle," with the bright star Regulus at the end of the handle; and, once seen, it can hardly be forgotten. Regulus is in the Lion's heart, and the curve of the sickle nearly outlines his head. The three bright stars to the eastward are in his hind quarters and tail. Besides these, two fainter stars (not shown on our map) west of Regulus mark his fore paws, and the line of his hind legs is indicated by three small stars south of θ; and so, all told, we have one of the best cases (alas! too rare) of resemblance between a constellation and the thing for which it is named. The very bright object near the middle of the constellation is Jupiter.

Some of the individual stars of the Lion deserve our notice. Regulus, according to the parallax measurements of the Yale Observatory, is a distant star, whose light takes about a century to reach us. To look as bright as it does, at so great a distance, it must really be of very great luminosity — according to the best data, about three hundred times as bright as the sun, or ten times as bright, in reality, as Sirius (which looks so much brighter because it is over ten times nearer us).

The next star, in order of apparent brightness, in Leo is β Leonis, or Denebola, at the other end of the constellation. The Yale observers have also measured its distance, and find it about one-third of that of Regulus. Its real brightness comes out some ten times that of the sun.

None of the other conspicuous stars in Leo has been the subject of measures for parallax, and so we cannot continue our catalogue of their distances and real brightness. But the star γ deserves attention as a very fine double, whose components, one three times as bright as the other, are separated by about 3½ min. of arc, and so can be easily seen in a small telescope, with a suitable eyepiece. These two stars are moving together through the sky, but their relative motion shows no sign of curvature as yet. It is probable that they are really revolving about one another, but in a period of thousands of years, and an orbit so large that the little piece of it over which they have passed during the century looks like a straight line. Below Leo, on the left, is Virgo, with one bright star, Spica, which, like Regulus, is at an enormous distance from us. The star γ in this constellation is again a fine double. It can be easily found on the map, or without it, a little less than half way from Spica toward Denebola.

In this case the period of revolution is about 180 years, and almost a complete revolution has been observed. The orbit is a very eccentric ellipse, and the two stars, which are now not far from their greatest separation, were separated by only 1/15 their present distance in 1836.

Below these constellations we find the huge Sea Serpent, Hydra, with two small groups, Corvus and Crater. The latter is inconspicuous, but the former is quite prominent. Its two uppermost stars point toward Spica, just as the "Pointers" do toward the Pole Star. The one nearest Spica is double—a much wider pair than those mentioned above. The star ϵ Hydræ (in the Serpent's head) is too remarkable a double to pass by. It has an eighth-magnitude companion, 3½ min. distant, which is visible with a small telescope. A large one brings out a fainter attendant, six times as far off, and a very powerful one reveals that the principal star itself is a very close double. This last pair is a rapid binary, completing a revolution in about fifteen years. The other two stars belong to the same system; but their periods of revolution must be counted by hundreds of years in one case, and thousands in the other.

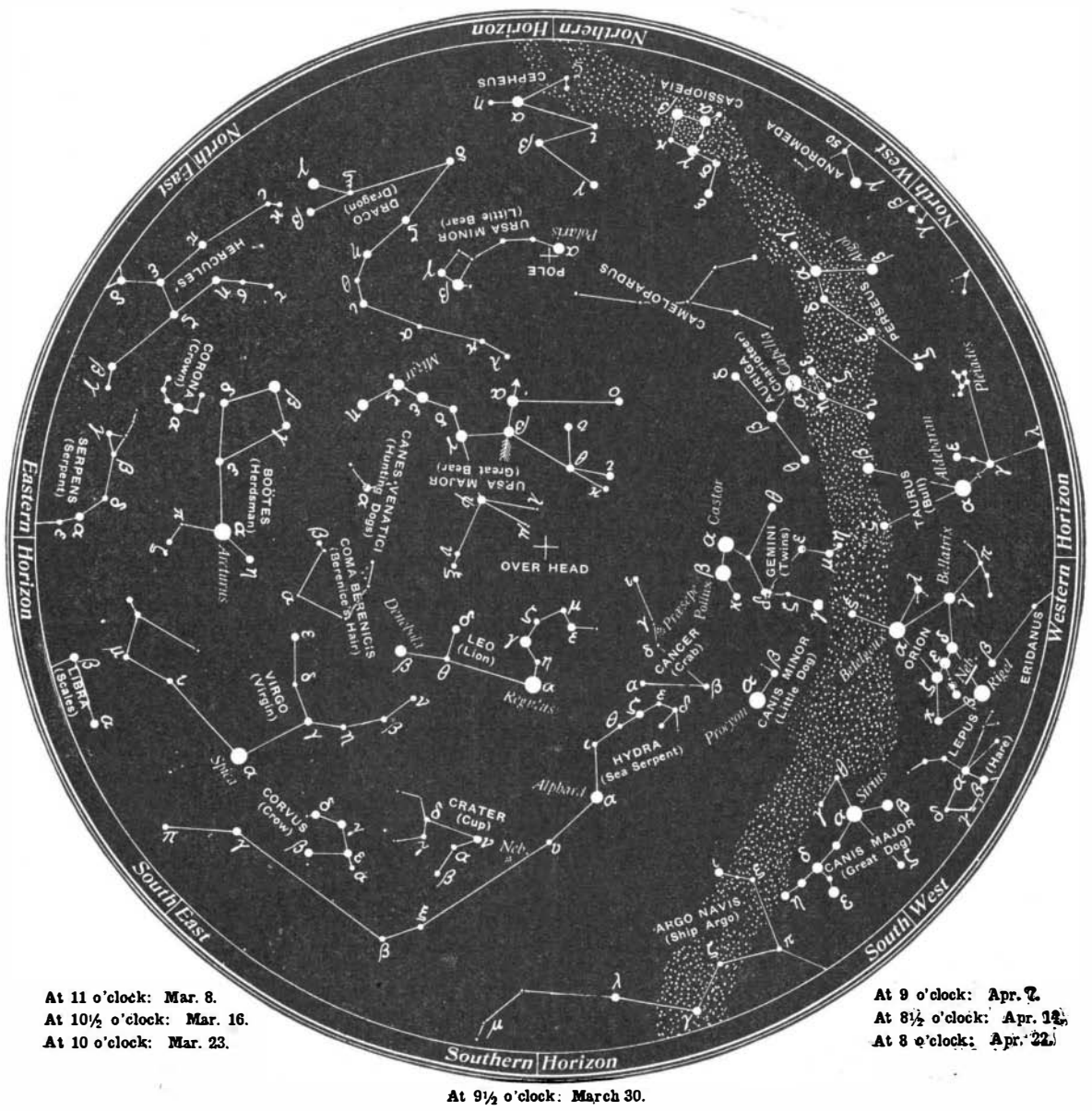
In the last we find Boötes, whose chief star, Arcturus, forms an almost equilateral triangle with Denebola and Spica. Below its northern portion are Corona and Hercules (just rising). Draco is displayed, head downward, in the northeast, and Ursa Major is above, north and east of the zenith. Cassiopeia and Cepheus lie low along the northern horizon, and Ursa Minor extends to the right from the Pole. Perseus is low in the northwest, with Auriga above him. Orion, with Taurus on the right and Canis Major on the left, lights up the western sky. Gemini and Canis Minor higher up complete the tale of the brighter constellations.

THE PLANETS.

This is a poor month for the planetary observer. Only Jupiter is well placed, though Mars can be seen in the small hours of the morning.

Mercury is in conjunction with the sun on the 21st, passing behind him. Before this time he is nominally a morning, and afterward an evening star, but he is practically invisible all the month.

The same, word for word, may be said of Venus, except that the date of her conjunction is April 28th.



At 11 o'clock: Mar. 8.
At 10½ o'clock: Mar. 16.
At 10 o'clock: Mar. 23.

At 9 o'clock: Apr. 7.
At 8½ o'clock: Apr. 14.
At 8 o'clock: Apr. 22.

At 9½ o'clock: March 30.

NIGHT SKY: MARCH AND APRIL

Mars is morning star in Sagittarius, rising about 2 A. M. in the middle of the month, and only moderately bright.

Jupiter is in Leo, and comes to the meridian about 9 P. M. in the middle of the month. He is by far the most conspicuous object in the evening sky and, next to the moon, the one which most repays observation with a small telescope.

Saturn is in conjunction with the sun on the 3d, and is practically invisible, except just before sunrise at the end of the month.

Uranus is in quadrature with the sun on the 11th, and comes to the meridian at 6 A. M. Neptune is likewise in quadrature, on the 4th, but, being east of the sun, souths at 6 P. M.

THE MOON.

Full moon occurs at 3 P. M. on the 5th, last quarter at 9 A. M. on the 13th, new moon at midnight of the 19th, first quarter at 4 A. M. the 27th. She is nearest on the 18th, farthest on the 3rd and 30th. She is in conjunction with Jupiter on the 2nd, Mars on the 14th, Saturn on the 18th, Mercury and Venus on the 19th (when both planets and the moon are close together but all too near the sun to be seen), Neptune the 25th, and Jupiter once more the 29th.

Princeton University Observatory.

An Opportunity for Inventors.

Among the numerous opportunities open to inventive genius at the present time, there is one problem the solution of which, in view of its vital importance to certain flourishing industries, possesses advantageous financial possibilities. A flourishing trade is maintained in what may be termed the cheap and essential liquids of commerce, both of a domestic and industrial nature, which have to be placed on the market at a very low price. The best example of such a commodity is vinegar. Unfortunately, however, such liquids have to be stored for transit in substantial, well-built, durable barrels made of oak, such as are used for the more costly alcoholic liquors and beverages. The result is that the package is worth more than its contents. Where the material is being transported in bulk, say in casks of twenty-five gallons capacity or thereabout, the manufacturer seldom experiences any losses in non-returns or damage owing to their cumbrous nature, weight, and expense; but in those trades where recently it has been found necessary to adopt a small cask, say of six gallons capacity, to meet the demand of small tradesmen, different conditions prevail. The cask is small, and the purchaser often considers it a waste of time to return it to the manufacturer, while the imposition of a charge for non-return by the latter may mean the possible loss of a customer. Moreover, considerable expense is incurred in maintaining these barrels, which suffer severely from damage in transit, and consequently require periodical overhauling, such as rehooping. The result is that the manufacturer finds that the small cask trade is unprofitable, albeit it is a developing factor in his business. To remedy this state of affairs a demand has arisen for a new type of cask, and there are two possible solutions of the difficulty. One is the evolution of a strong small cask, capable of withstanding at least one railway journey, sufficiently cheap to enable the manufacturer to give it away with the contents. The second alternative is the production of a cask infinitely superior to the wooden barrel at present used, especially in point of durability, with necessity of repairs obviated, and comparing favorably with the oak cask in point of cost. The vessels of whatever material composed, must be of the same design as the ordinary cask, and must conform with the regulations of railways and other carriers of merchandise. Care must be exercised in selecting a constructive material which shall be able to resist the corrosive or other characteristics of the liquid with which it is to be filled—Chambers's Journal.

The following case-hardening mixture is recommended in the American Engineer and Railroad Journal. Put in a 2-inch layer of charcoal, broken into about 1-inch pieces, and pack it down in the bottom of the box used for the case-hardening. Then sprinkle about 1 pound of common salt over the charcoal, and 1 pound of pulverized sal soda over the salt. Then 1 pound of powdered resin is placed over the sal soda, and 1 pound of black oxide manganese over the resin. The material to be case-hardened is now laid on this, care being taken not to place the pieces too close together or too close to the sides of the box. Between the pieces, charcoal is filled in and well packed, care being taken to have about 2 inches of charcoal between the different pieces, if they be large. Now the sprinkling of the compounds on the work is repeated in reverse order, so that a 2-inch layer of charcoal is placed on the top of the box. Sprinkle a little salt on the top of the charcoal, then put the cover on the box, calk with clay, and place the box in the furnace from ten to fifteen hours, heating it to a bright red. Then cool it in cold, clear water.