THE HEAVENS IN MARCH.

BY HENRY NORRIS RUSSELL, PH.D.

Though the activity of the solar surface is now decreasing from the maximum of a year ago, large spot groups from time to time appear. A very conspicuous one has just passed out of sight behind the eastern limb of the sun, and if it does not break up or disappear in the meantime, it will come into sight again on the opposite side of the sun about the 3d of March and remain in sight till the 16th.

This group was visible without difficulty to the naked eye when a suitable shade glass was used, and showed considerable detail in a field-glass. In using the latter to look at sun-spots, it is well to put the smoked glass between the eyepiece and the observer's eye, and it is of course essential to take care that the intense light passing through the other half of the instrument does not fall on the observer.

A great amount of work has been done on sun-spots and their spectra during the recent maximum, and some very interesting results have already been published. Among them is an important discussion by Prof. Heale and several of his assistants at the new Solar Observatory on Mount Wilson, Cal.

Their observations, like those of many earlier observers, show that the spectra of sun-spots, while in general similar to that of the rest of the sun's surface, differ in many details. Some lines are widened and intensified, others are weakened, and some are even reversed, appearing bright in the spot although dark elsewhere. Of the lines belonging to some one element, such as iron, some will be affected in one direction and others quite in the opposite way, so that the changes are clearly not due to any difference in the chemical composition of the material of the spots and of the rest of the sun's surface.

Now these same lines are seen (bright in this case) when the metal in question is put into an electric arc, and the astronomers of the Solar Observatory, comparing photographs taken under varying conditions, find that if we compare the spectra of two arcs containing the same metal, but produced in one case by a powerful current and in the second by a very weak one, the various lines are affected in almost exactly the same way, on changing from the strong to the weak current, as in passing from the sun's surface to a sun-spot.

In the case of the two arcs, it is pretty clear that the principal difference between them is in their temperature. The stronger current produces much more heat. This conclusion has been tested in a variety of ways, and it seems certain that in the laboratory the observed changes in intensity of the different lines are due to the changes in temperature of the luminous matter.

Now the changes of the lines in the sun are almost exactly similar, and so it is reasonable to conclude that sun-spots are colder than the rest of the sun's surface. This accounts at once for their relative darkness, and also for the fact that their light, if isolated, is much redder than that of the sun in general. They behave exactly as a red-hot body in front of a white-hot one would do (though it is to be remembered that the coldest part of a sun-spot is probably fully as hot as the hottest electric furnace we can produce artificially).

It does not follow because sun-spots are colder than the rest of the sun, that the sun as a whole sends us least heat when it is most spotted. All spots are surrounded by a disturbed area much larger than themselves, and this may be hotter than the undisturbed surface, and more than make up the loss of heat due to the spot. In any case the total effect is probably very small, as spots seldom, if ever, cover as much as 1/300 of the sun's disk.

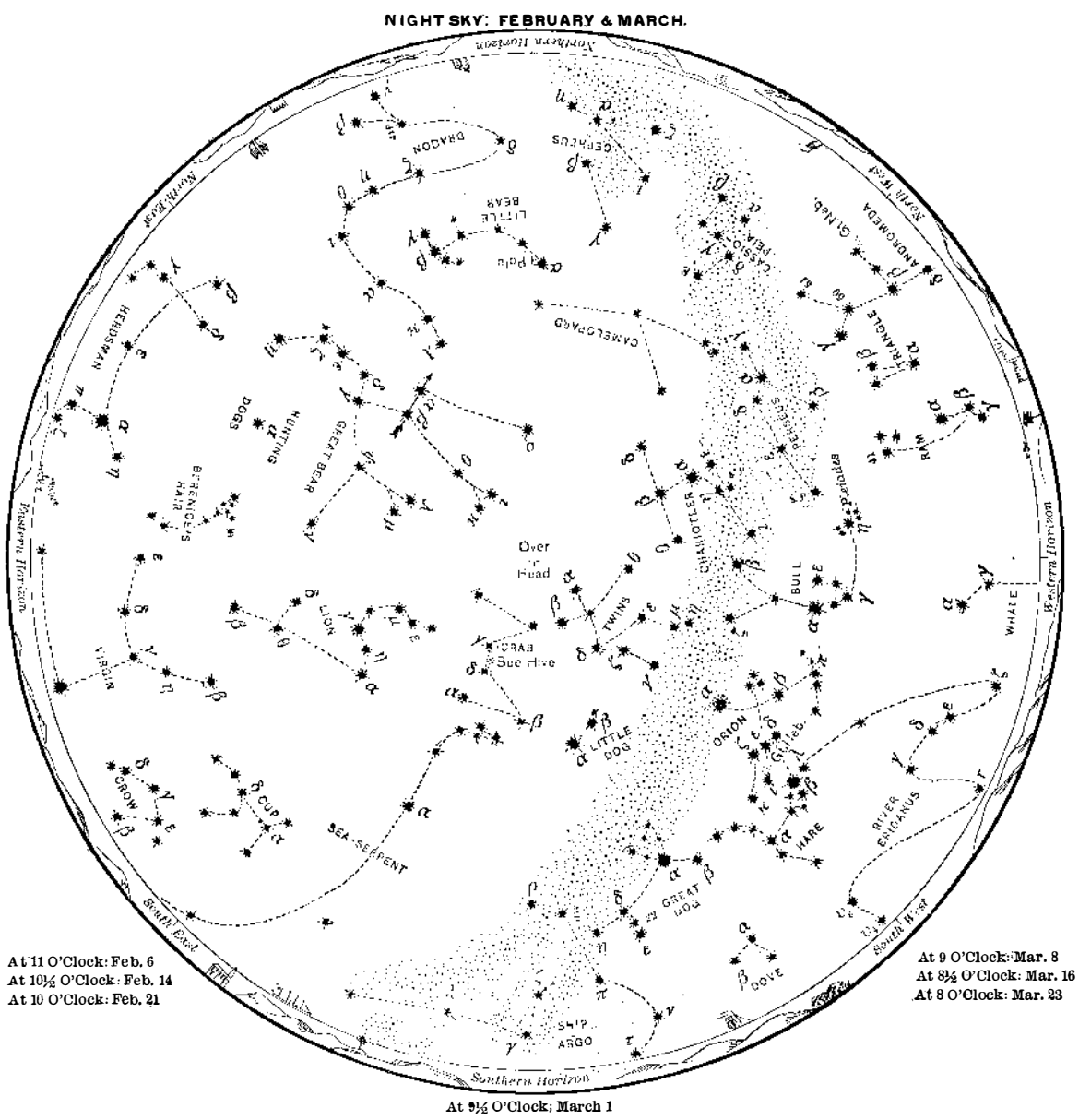
There is undoubtedly a connection between sun-spots and certain electrical disturbances on the earth; namely, the "magnetic storms," which may alter the direction of the compass needle by half a degree, and cause such earth-currents as to interfere with the working of telegraph lines. But whatever the mechanism of the connection (which is still unknown) it is not an infallible one. When sun-spots are most numerous magnetic storms and auroras are most frequent, but it is not certain that any particular big spot will be accompanied by a magnetic storm, though this often happens.

THE HEAVENS.

Our map shows the principal constellations as they appear in the early evening. The Milky Way forms a slanting arch across the sky, passing west of the zenith. Following it from the north we see Cepheus, then Cassiopeia, next Perseus, and Auriga (the Charioteer), then Gemini (the Twins), and Orion, and finally Canis Major (the Great Dog) and Argo on the southern horizon. In the west are Andromeda, Taurus, Aries, and Eridanus, with all of which we are familiar.

In the southeast is most of Hydra (the Sea-serpent), which incongruously bears on its back the Cup (Crater) and the Crow (Corvus). Leo the Lion is high in the east, and below him is Virgo, whose brightest star Spica has just risen.

The Great Bear fills a large part of the northeastern sky. Below on the right is the single bright star of the Hunting Dogs, and the little cluster of Berenice's Hair. Still lower is Bootes the Herdsman, whose principal star Arcturus has just risen. The Dragon and the Little Bear, low in the northeast, complete our list.



At 11 O'Clock: Feb. 6
At 10½ O'Clock: Feb. 14
At 10 O'Clock: Feb. 21

At 9 O'Clock: Mar. 8
At 8½ O'Clock: Mar. 16
At 8 O'Clock: Mar. 23

At 9½ O'Clock: March 1

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.

THE PLANETS.

Mercury is evening star until the 18th, when he passes between us and the sun and becomes a morning star. He is very well placed for observation at the first of the month, being unusually bright, and setting one and one-half hours later than the sun. In the middle of the month he is invisible, but toward the end he may be visible just before sunrise.

Venus is morning star in Sagittarius and Capricornus, and rises about 4:30 A. M. on the 15th.

Mars is also a morning star. On the 9th he is in quadrature with the sun, and comes to the meridian at 6 A. M. Jupiter is in Gemini, conspicuous in the evening sky. He is also in quadrature during the month—on the 23d—but being east of the sun he crosses the meridian at 6 P. M. Saturn is in conjunction with the sun on the 8th, and is invisible.

Uranus is in Sagittarius, and rises at about 3 A. M. on the 15th. Neptune is in Gemini, and is in quadrature on the 31st.

THE MOON.

Last quarter occurs at 4 A. M. on the 7th, new moon at 1 A. M. on the 14th, first quarter at 8 P. M. on the 21st, and full moon at 3 P. M. on the 29th. The moon is nearest us on the 9th, and farthest off on the 21st. She is in conjunction with Mars on the 7th, Uranus on the 9th, Venus on the 10th, Saturn on the 13th, Mercury on the 14th, Jupiter on the 21st, and Neptune on the 22d.

At 1 P. M. on the 21st the sun crosses the celestial equator and enters the sign of Aries, and in almanac language, "spring commences."

Princeton University Observatory.

PEARLS FROM THE SULU SEA.

The possibilities of pearl fishing in the Sulu Sea seem unlimited. The greatest pearl ever claimed from the sea in the Sulu archipelago was recently marketed in Singapore for 60,000 pesos (nearly $30,000). It is the size of a small marble, perfectly round and of perfect color. The finding of the gem by a poor Moro fisherman, its seizure by the Sultan of Sulu, and the interference of Gov. Steever, who took the part of the poor fisherman, is an interesting incident.

Under the old Moro law, in force when the American troops first took charge of Jolo, all pearls of unusual size must be sent to the Sultan, who in return made the finder a "present." The only alternative the finder of a large pearl had was to sell his treasure privately to the pearl traders. This placed his life in jeopardy, for if the trader could not buy the gem at his own price he could report the matter to the Sultan, who had the power to seize the finder and execute him. Under American rule, however, this law has been abolished. The finder of this $30,000 pearl knowing this fact, when his find was seized by the Sultan, he speedily made a trip to Jolo and reported the matter to Gov. Steever. The matter was taken to court, and the Sultan forced to give up the pearl. The Governor commissioned the Jolo Trading Company to sell the pearl for the finder, they receiving twenty per cent for so doing.

So far as known this pearl is the largest ever taken from the Sulu Sea, though owing to the secrecy practised in selling the gems before American rule in Sulu, there may have been greater finds. Three years ago a pearl found somewhere to the south of Jolo was carried to Batavia, and there sold to a European buyer for $18,000.

During the recent fair at Jolo, given by the government for the purpose of bringing the Moros together, Capt. Trana, of the Jolo Trading Company, exhibited a magnificent black pearl valued at $7,000, a rare gem of unusual size and beauty.

LIGHT AND BLOOD.

According to a notice published in the German medical press, Dr. Oerum, of the Finsen Institute at Copenhagen, has just carried out a number of experiments on the effect of light on the blood, of which a few results are given in the following:

Darkness has been found to reduce the total amount of blood by 3 to 3.3 per cent, while decreasing at the same time the amount of blood contained in the heart. Red light will exert a similar action to darkness, while blue light is apt to result in an excess of blood, and an increase in the amount contained by the heart. Light baths are apt to increase the amount of blood in the course of four hours. Darkness will reduce the amount of blood contained in the heart within three to four weeks, and intensive light will have the same effect in four hours. Darkness will increase, and intensive light will reduce the blood pressure. Animals born in the dark or in red light have a greater weight but only half the amount of blood of those born under normal conditions.