and machinery houses of Germany are anything but good, but they are better during the past two and three months than they were last autumn. If the coefficient 5 represent normal conditions, the coefficient 1½ would represent conditions late last year. At the present time the conditions are represented by the figure 2¼. In a number of German establishments practically the whole output just now is in filling American orders—orders which are the result of inability on this side of the water to meet the demand. These orders are largely in the nature of calls for structural steel and allied work, and at one plant which I visited there was an order on hand from America for 20,000 tons of steel rails. The prosperous conditions in the United States have also been felt in the German machine tool trade, and a number of respectable orders for the best grade of German tools to fill demands on this side were in evidence when I was in Berlin.

"On the other hand, I visited a number of German establishments which ordinarily would employ 1,500 to 1,800 men, and not a wheel was turning over in the shop; the cause was—no orders. The depression was so great some five months ago that in many sections of Germany the word 'distressing' best expressed it. But now the outlook is brighter, and with the amalgamation of many interests there is every prospect of the German trade regaining ground. I found considerable apprehension expressed in many quarters regarding the possibly far-reaching influences of American trusts, but I am inclined to think that this feeling of apprehension is disappearing; in fact, some German manufacturers were inclined to ascribe their good fortune in receiving American orders to the very existence of the trusts.

"The electrical business in Germany has been even poorer of late than the iron and steel trade, and the stability of some establishments has been threatened. The amalgamation of many of the important plants has saved a number of these houses.

"Despite the depressing conditions which existed, I failed to hear any talk of strikes or of marked discontent. This is doubtless due to the national spirit, which again is the outcome of military training. On the other hand, there is not apparent among the German workmen the ambition so familiar to us in this country. I am reminded of the American manager whose services had been secured for a German establishment, and who finding a number of orders on hand, endeavored to dispose of these orders by encouraging the workmen to work harder. Inasmuch as the employés were paid on the per cent basis, the manager felt that he was quite in order in urging extra work. He therefore called the foremen together, and endeavored to impress upon them the necessity for greater effort. On the day following, the manager found that the volume of output was exactly the same as the day before. He made a second appeal, but still the volume of output remained the same as before. In his anxiety to dispose of the orders the manager succeeded in having an increased per cent allowance awarded, but despite this concession the volume of output remained as previously. The manager then tried a new tack. He cut the per cent, and immediately the volume of output rose to a point where the workmen could receive the same income as they had formerly derived.

"There is a tremendous latent force in Germany which cannot fail to impress the American who visits the German shops. It is a force which, if thoroughly aroused, will give us a tremendous struggle in the commercial world. But of the two classes, the German workman is doubtless the happier, and in the great Essen district, where the wise administration of the Krupp factory prevails, one finds probably the most ideal and contented community of all Europe. Such a thing as a strike is unknown where the Krupp influence exists."

THE HEAVENS IN JUNE.

BY HENRY NORRIS RUSSELL, PH.D.

At 10 o'clock on the morning of June 22 the sun enters the sign of Cancer, and in the phrase of the almanacs, "Summer commences." In other words, the sun reaches his greatest north declination, and consequently remains above the horizon for a longer time than on any other day of the year.

In spite of the lateness of sunset, the twilight will be pretty well over by 9 o'clock—at least in the latitude of New York—so that we need not change our hour of observation.

At 9 o'clock on the evening of June 15 Arcturus, the brightest star in sight, is nearly overhead, being about 20 deg. south of the zenith. Half way down from him toward the horizon, and rather to the westward, is Spica. Mars, which still vies with Arcturus in brightness, lies farther west in the same direction, but farther on and lower down, we reach first Regulus and the other stars of Leo, and then Castor and Pollux, the last just ready to set.

Between Leo and the Pole is Ursa Major, which covers an immense amount of sky, the familiar Dipper being less than half of the constellation.

In the south, below Spica, we can see part of the southern constellation Centaurus, while in the southeast appears the more familiar form of Scorpio, with the fiery Antares blazing at its heart, and its long curving tail sweeping down to the horizon.

The bright star in the Milky Way, almost due east, is Altair in Aquila, while the still brighter one higher up on the left is Vega, which belongs to the constellation Lyra. Below Lyra is Cygnus, marked by a cross of bright stars whose upright lies along the middle of the Milky Way. Between Vega and Arcturus lie the large, but dull expanse of Hercules and the pretty semicircle of Corona. The large space between these and Scorpio is filled by Ophiuchus and Serpens. The outlines of the serpent and of the giant who carries him are too much confused to be well traced without the aid of a star-map and celestial globe.

Of the circumpolar constellation, Cassiopeia is below the pole, almost out of sight, Cepheus to the east of it, and Ursa Minor and Draco above.

Now that Lyra is once more conveniently placed for observation, it is a good time to refer to a very interesting piece of work that appeared last autumn; namely, the determination of the parallax and distance of the famous ring nebula in this constellation.

This remarkable object may easily be found by those who have telescopes of moderate size, as it lies almost on the line joining Beta and Gamma Lyræ—the two small stars which lie about one-quarter of the way from Vega toward Altair. In a small telescope it appears simply as a faint oval ring of light, greenish in hue, with an apparent diameter nearly twice as great as that of Jupiter. With great telescopes many finer details are visible, and even more is shown by photography, including a star-like condensation in the center which is only visible with the most powerful instruments.

A number of photographs of this nebula, taken at the observatory of the University of Minnesota, have been measured and reduced by an American student in Germany. They afford conclusive evidence that the central star of the nebula has a sensible parallax, amounting to about 1-10 of a second of arc.

As this central star is exactly in the center of the ring, and shows the same gaseous spectrum as the rest of the nebula, there can be no doubt that it is a part of it.

We are consequently able to calculate the real distance and size of the nebula. The former appears to be about two million times that of the sun, so that the light of the nebula takes over thirty years to reach us. It is, however, a near neighbor of ours as stellar distances go, being only three or four times as far away as Sirius or Procyon, and nearer than Capella or Vega—as far as the best observations show. The apparent diameter of the nebula, measured along the longer axis of the oval, is 80 sec., which corresponds to a real diameter 800 times the earth's distance from the sun. This is 13 times the diameter of the orbit of Neptune, so that the whole solar system is a small affair alongside of this nebula.

Of the mass and density of the nebula we have as yet no knowledge; nor do we know why it shines. The spectroscope shows that it, like many other nebulæ, is gaseous; that is, the luminous part at least is gaseous, and contains hydrogen, helium, and some unknown gas whose lines are the brightest of all. But why this gas shines, whether because it is hot, or under electrical action, or under other conditions quite different from anything that we are able to produce in our laboratories, no one knows. It is one of the many unsolved problems of astrophysics.

THE PLANETS.

Mercury is evening star until the 3d, when he passes through inferior conjunction, and becomes a morning star. He will not be visible till the last few days of the month, when he is again in elongation. This happens on the 27th, and for some days about that date he rises almost an hour and a half before the sun, so that he should be easily seen.

Venus is evening star, still steadily moving away from the sun and growing brighter. But as she is also moving southward, she becomes somewhat less conspicuous, as the interval between sunset and her own setting decreases from 3¼ hours on the 1st to about 2½ hours on the 31st. At the beginning of the month she is in Gemini, near Castor and Pollux, while at its end she is in Leo, having crossed the whole width of Cancer in the interval.

Throughout the month she can be seen in broad daylight if one knows where to look for her, and there is not the least difficulty in seeing the shadows cast by her light if one admits it through a window into an otherwise dark room.

Mars is in Virgo, and is still a conspicuous feature of the sky, though less than half as bright as he was in April. He is moving eastward among the stars, and decreasing in brightness.

Jupiter is morning star in Aquarius. On the 13th he is in quadrature, and rises a little after midnight, reaching the meridian at 6 A. M.

Saturn is in Capricornus. On the 15th he rises at about 10 P. M. Uranus is in opposition on the 15th, and is just visible to the naked eye on a clear night. He is in Sagittarius in right ascension 17 h. 32 m., and declination 23 deg. 26 min. south. It is difficult to describe his position, as there are no well-known stars near him, but he can be found with the aid of a star-map or identified by his motion, which is in an easterly direction, at the rate of 1 deg. in three weeks.

Neptune is in conjunction with the sun, and is invisible.

THE MOON.

First quarter occurs at 8 A. M. on the 2d, full moon at 10 P. M. on the 9th, last quarter at 2 A. M. on the 18th, and new moon at 1 A. M. on the 25th. The moon is nearest us on the 13th, and farthest away on the 25th.

She is in conjunction with Mars on the evening of the 3d, Uranus on the 10th, Saturn on the 14th, Jupiter on the 17th, Mercury on the 23d, Neptune on the 25th, and Venus on the 28th.

None of these conjunctions are close, that with Mars being the nearest, about 2½ deg.

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SCIENCE NOTES.

Monsoon stations are to be established in India for the purpose of taking observations by means of kites and kite balloons. The first station will be in the Himalayas at Simla, 7,000 feet above the level of the sea.

Announcement has been made of the election of Dr. Robert Koch as the foreign associate of the Paris Academy of Sciences, which place was formerly held by Prof. Rudolf Virchow. Dr. S. P. Langley was mentioned for the place, and received six votes.

At a recent meeting of the National Association for the Prevention of Tuberculosis in London, it was announced that Messrs. Wernher, Beit & Co. had made a second gift of twenty thousand pounds sterling to further the work of the association. A like amount, given some time ago with the stipulation that it should be used only so as to be of benefit to the poor of London, has been entirely spent in the erection and partial equipment of a sanitarium with sixty-four beds at Pine Wood, near Wakingham, and this second amount was given in order that the undertaking might be completed.

Mr. Follett Osler, the inventor of the anemometer, recently died at the age of ninety-five. Originally he was interested in the glass-manufacturing industry at Birmingham, where his father carried on the business of glass-toy making. When Mr. Follett Osler succeeded to the business, he devoted his special attention to the making of large glass chandeliers and one of his most notable achievements was the manufacture of the huge glass fountain which was such a feature of the Great Exhibition held in London in 1851. Before that time no articles in glass were produced exceeding 3 feet in height, but he made several glass objects exceeding 20 feet in height. He constructed a magnificent, huge glass sideboard for the Paris Exhibition of 1878, and also manufactured table glass, devoting special care to the purity of color, fine cutting, and engraving. When he retired from the glass industry he devoted his energies to meteorological apparatus, natural philosophy, and mechanics. His first anemometer he devised in 1836, and this was the first instrument constructed for measuring the pressure and registering the direction of the wind. In his contrivance there was a large brass plate 12 inches square, supported upon springs, and this by means of a vane was always maintained at a position at right angles to the direction of the wind. Each gust of wind when it blew upon the plate forced it backward, and the pressure thus exerted was recorded by a pencil upon a sheet of paper stretched upon a drum, driven by clockwork so as to make one complete revolution once in every four hours. The motions of the vane indicating the direction in which the wind was blowing were also simultaneously registered upon the same drum with another pencil, while the amount of the rainfall as recorded by the rain-gage was duly indicated by a third pencil. This anemometer was first set up by Osler upon the roof of the Philosophical Society's building in Birmingham in 1836, and is still in use to-day, rendering valuable service at the Midland Institute Observatory in the same city. For the invention of this instrument Osler was elected a Fellow of the Royal Society of Great Britain. His other most important appliance is that utilized in connection with anthropometry, the branch of this science for which it was specially adapted being the measurement, with minute exactness, of the human head. In this device there is a special clip especially for the cross section of the skull, with a sliding pencil which registers the exact contour of the head and gives measurements in small fractions of millimeters.