

The value of these requisites to successful industrial enterprise needs no exposition. In addition to these prime advantages, are claimed cheap mill sites, low taxes, cheap building material, cheap fuel, a low rate of living expenses, and present freedom from labor agitation.

It is the tardy, but now general, recognition of these economic advantages which has brought about the present general awakening of industrial movements in the South. The growth has largely taken place within the past five years. In textile manufacturing, as has been indicated, the gain is prodigious. While there were 7,160,000 spindles in Massachusetts at the beginning of 1895, there was no State south of Mason and Dixon's line with 1,000,000. In 1898 both of the Carolinas had over one million apiece, with Georgia close behind. From 1896 to 1898 the number of spindles in Massachusetts had increased only $1\frac{1}{2}$ per cent.; but South Carolina had made a gain of 26 per cent. In Alabama the increase in the number of spindles for the same time was 36 per cent.; Kentucky, 17.35 per cent.; Arkansas, 16.43 per cent.; and North Carolina, 13.12 per cent. The increase in both the Carolinas for the decade ending 1896 was over 300 per cent. During the current year mills are being rapidly erected and the development continues on a colossal scale. It is estimated that the increase in the price of raw cotton to nearly 10 cents a pound had added almost \$200,000,000 to the available wealth of the Southern people in a single season. It is evident that this accretion of wealth demands investment. The Southern capitalists are putting their money into new factories as the best possible outlet for surplus capital. It has been stated that every Southern cotton mill is making over 15 per cent. on its capital. In many cases, it is declared, the profits for 1899 ran up to 75 per cent., and there is a certainty that this prosperity will be exceeded during the present year.

Perhaps in no section has the Southern movement been viewed with livelier interest than in New England, the citadel of the cotton industry. In the large cotton centers of Massachusetts and Maine, the manufacturers have claimed that a reduction in wages was necessary to enable them to make goods in competition with the low wages and long hours in the South. In New England nearly uniform laws respecting hours of labor and employment of children make the conditions more equal in the competition of these States.

However, although a healthful competition may arise, no serious antagonism is anticipated between the industrial interests of the North and South. The outcome will undoubtedly simply be that the entrance of the South into the arena of cotton manufacturing will bring about a readjustment of producing centers. It is aptly pointed out that as our textile manufacturing grows, it is fast becoming separated into distinct classes, each class starting about some special place. Thus Fall River leads in the manufacture of prints. Providence is the center of the worsted industry. New Bedford sets the standard in finer white cottons, and Lowell in coarser goods. New England as a whole is coming year by year to finer counts. As long as no other part of the United States was engaged in manufacturing coarser goods, New England retained her grasp in that field, leaving the finer makes to foreign looms. But each year sees a finer product from New England looms. Climatic advantages over the South in the way of the essential degree of humidity will always be in favor of New England. This fact seems to relegate to the South the coarser products, for which humidity is not so necessary. The rapid perfecting of humidifying apparatus, however, is minimizing to some extent the climatic disadvantage of the South.

The commercial interests of the North and the South are too interrelated to become antagonistic. The Southern mills are wisely welcomed by the broad minded New England manufacturers as notable additions to American industries. The Southern movement is providing a direct stimulus to national production. It is working primarily as a lever in educational progress in promoting schools for training textile workers and skilled craftsmen and designers to produce the finer and more valuable products which will in the future more and more constitute the output of Northern looms.

If no other proof were at hand to show the advance of cotton manufactures there, the consumption of cotton in the Southern States would reveal the fact. In 1891-2, 686,080 bales of cotton were used in Southern mills. In 1894-5 this amount had increased to 862,838 bales. In 1898-9 to 1,413,923 bales. North and South Carolina are now using 50 per cent. of their cotton product. The 75,000 spindles in operation at Columbus, Ga., have just been increased to 100,000 and the 30,000 bales of cotton required to 60,000 bales. Local mill men are thus displacing the dealers, and what has been successfully accomplished in the Carolinas is rapidly becoming a fact in Georgia as well. With the growth of manufacturing and consequent increase in the consumption of raw material will come the demand for greater production of cotton. It is well held that the South could produce two bales of cotton for every

one now marketed. The real relief to the over-supply of cotton products would, of course, come from the opening of foreign markets. Commercial expansion is in the air. Our export trade already shows the trend in this direction. The increase of manufactures is fifty million dollars greater for 1899 than the amount for the corresponding months in 1898.

Attention is called to the fact by a recent writer that only one-third of the cotton grown in the United States (which in 1898 reached 10,000,000 bales), has hitherto been used in this country. The other two-thirds has been shipped to England, Germany, France, Russia, India, Japan and other countries. We have been shipping three billion pounds of raw cotton at from 5 to 7 cents a pound when we might have exported manufactured products worth 15 to 25 cents a pound. The British exports of cotton goods in 1896, aggregated 5,218,248,600 yards in a year. American exports were only 281,211,521 yards. The query naturally is suggested, "Why may we not hope to manufacture our entire cotton product and export only manufactured product?"

It is evident to the thoughtful onlooker that the rapid development of textile manufacturing in the South does not necessarily involve its decrease in New England or in Great Britain. The ever-growing demands of the world furnish new industrial marts to conquer. And industrial progress in the South can only be regarded with satisfaction in view of the emancipation it is calculated to bring to that section through the nobility of well-requited labor.

THE HEAVENS IN JUNE.

BY HENRY NORRIS RUSSELL, A.M.

June, as well as May, is favored with an eclipse visible in America, but it is one of far less importance than its predecessor. While on May 28 the moon interposed itself exactly between the earth and the sun, on June 12 the earth is so far out of the direct line joining the sun and moon that only $\frac{1}{1000}$ of the moon's diameter falls within the shadow. Since, however, the earth hides most of the sun from parts of the moon near the shadow's edge, the darkening of the moon's southern limb by the penumbra will be easily seen, though it will require instrumental means to detect the tiny notch in the limb, due to the true shadow.

The circumstances of the eclipse are:

Moon enters penumbra June 12, 8:15 P. M.	Eastern standard time.
Moon enters shadow " " 10:24 P. M.	" " "
Moon leaves shadow " " 10:31 P. M.	" " "
Moon leaves penumbra June 13, 12:17 A. M.	" " "

The earlier part of the eclipse is therefore visible only in the East, as in the West the moon has not risen.

THE HEAVENS.

The Milky Way, inconspicuous for the last few months, has returned to the eastern sky by the middle of June. Along its course lie several of the most easily recognized of the stars and constellations in sight—the irregular W of Cassiopeia in the north, the cross of Cygnus in the northeast, Altair, marked by a smaller star on each side, in the east, and Scorpio in the south, identified by the fiery Antares, and the long curved stream of stars sweeping southward and forming the tail of the monster. West of the Galaxy, near Cygnus, is the brilliant Vega, and about as far from the zenith on the opposite side shines Arcturus. Ursa Major, Leo and Virgo are the most conspicuous ornaments of the western sky.

Vega, Arcturus and Antares offer a striking contrast in color, the first being white with a strong tinge of blue, the second yellow and the third red. This difference, beautiful as it is to the eye, becomes far more impressive to the mind when we know that these three stars are good examples of the three classes into which the spectroscope divides the vast majority of all stars observed, and that there is good reason to believe that they represent three different degrees of stellar temperature—the white stars, as might be expected, being hottest, the yellow intermediate, and the red coolest. So these three stars present to us at a glance types of three stages in the life history of a sun—displaying at one time conditions separated by countless ages in the gradual cooling down (or perhaps warming up) of a single star.

THE PLANETS.

Mercury is evening star throughout June, but is too near the sun to be seen in the early part of the month. It travels rapidly eastward among the stars, passing from Taurus through Gemini into Cancer, and at the end of the month is easily visible in the evening twilight, setting about an hour and three-quarters after sunset.

Venus is also an evening star in Gemini, approaching the sun all through the month, and losing brightness as its crescent becomes narrower, in spite of its steady approach toward the earth. On the 21st it is in conjunction with Mercury, being a little over 2° distant, and affording a particularly good opportunity for those unfamiliar with the latter planet to recognize it. By the end of the month Venus sets less than an hour later than the sun, and is no longer conspicuous.

Mars is morning star in Aries and Taurus, rising

about two hours earlier than the sun, but is still faint and distant.

Jupiter has just passed opposition and is by far the most conspicuous object in the Southern sky. His satellites are easily seen with a field-glass, especially if its power has been doubled by placing both the concave eye-lenses in the same tube, (which must usually be lengthened with cardboard to allow for the change of focus). With such an arrangement the crescent form of Venus, the disk and satellites of Jupiter, and the elliptical outline of the ring of Saturn may all be seen, as well as the larger craters of the moon.

The study of the motions of Jupiter's satellites from night to night is interesting. The two inner ones move so fast that it is difficult to identify them without reference to the figures given in the Nautical Almanac. The third satellite which is the brightest of the four, will be east of the planet on the 2d, 9th, 16th and 23d and west on the 5th, 13th, 20th and 27th. The fourth and most distant reaches its eastern elongation on the 3d and 20th and its western on the 12th and 28th.

Saturn is in Sagittarius, rising about 9 P.M., on the 1st and 7 P.M. on the 30th. It is in opposition on the 23d, and the northern side of its rings is seen at as favorable an angle as possible, but it is so far south that the time during which it is far enough above the horizon to be observed is shorter than usual.

Uranus is in Scorpio, about $4\frac{1}{2}^\circ$ north and $2\frac{1}{2}^\circ$ east of Antares, and is barely visible to the unaided eye. Neptune is in Taurus. It is in conjunction with the sun on the 17th and is too close to it throughout the month to be seen.

THE MOON.

First quarter occurs on the night of the 4th, full moon at the time of the eclipse on the 12th, last quarter on the evening of the 19th, and new moon on that of the 26th.

The moon is farthest from the earth on the afternoon of the 5th, and nearest on the evening of the 18th. It is in conjunction with Jupiter on the afternoon of the 11th, with Uranus the same night, with Saturn on the afternoon of the 13th, when an occultation is visible in Europe, with Mars on the morning of the 24th, with Neptune on that of the 26th, and with Venus and Mercury early on the mornings of the 28th and 29th respectively.

Comment on the results of observation of the total eclipse is necessarily delayed till next month.

Princeton University Observatory, May 16, 1900.

THE EMIGRATION TO CAPE NOME.

An attempt has been made by the transportation companies interested in Alaska, and particularly in Cape Nome travel, to approximate the probable emigration to the latter port for the coming season, and the conclusion is that the estimates of 30,000 or 50,000 persons made by sanguine observers will hardly be reached. There are, at this time, fifty-eight steamers of all classes chartered for Cape Nome, to sail before June 1. The capacity of all these vessels is not beyond 15,000 travelers, and probably not more than 13,000 will take passage on the first trip.

As far as learned, every steamer has been sold up; but, as is always the case, many persons will defer the trip and await further advices before making the uncertain venture.

It is estimated that 5,000 tickets have been sold from San Francisco and 8,500 from ports of Oregon and Washington. If all of these are used, the full capacity of all vessels now chartered will be appropriated.

Estimating at 2,000 the number of people who wintered at Cape Nome, and the same number coming from other Alaskan points added to the 15,000 estimated to arrive from the States, would give 19,000 as the number likely to be found on the peninsula by July 1, 1900.

The early arrivals are likely to experience great hardship in landing. In 1899 the ice disappeared on June 21st. How those who arrive about the 1st of June are to land is a problem of infinite difficulty. The steamers will delay not a moment, and landing over the ice will be accompanied by great exposure and many uncertainties. The fatality is likely to be great.

The subsequent voyages will be eminently easy. The crowd is out of the way and the difficulties of landing will all disappear.

SIR WILLIAM H. BAILEY, of Sale Hall (England), has presented a meteorological clock to the new Sale Park. This unique gift will indicate the time on a large dial, while at the same time the mechanism of the clock will actuate a drum, upon which there will be recorded the fluctuations of the barometer, the direction of the wind, the rainfall, and variations of temperature. The diagrams will constitute weekly records. The clock is a great improvement upon any existing time piece of its character. It is to be erected in the Joule Memorial Tower, which has been erected to commemorate the fact that Dr. Joule, who discovered the mechanical equivalent of heat, and who was also one of the greatest investigators of the age in physical science, resided for several years in Sale.