

THE HEAVENS FOR DECEMBER.

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THE SUN.

The sun's right ascension on December 1 is 16 h. 33 m. 44 s.; and its declination south of the celestial equator is 21 deg. 58 m. 26 s.

On the last day of the month its right ascension is 18 h. 46 m. 7 s.; and its declination 23 deg. 1 m. 51 s. On the morning of December 21 the sun reaches its greatest southern declination, 23 deg. 27 m. 13 s. On that date also it enters Capricornus and winter is said to begin. It will be seen from the above that, even by the last of the month, the sun has returned northward nearly half a degree from its most southern dip.

Sun spots are rather infrequent just now, but an occasional fine group will reward the faithful telescopic observer.

MERCURY.

Mercury is evening star, but, having been in superior conjunction with the sun only two days before the month opens, it will not be visible until the latter part of December, when it must be looked for soon after sunset and near the sunset point.

On December 1, at four o'clock P. M., Mercury is in aphelion, or in that part of its orbit which is most distant from the sun. This must not be confounded with Mercury's greatest elongation from the sun as seen from the earth, which is, of course, an entirely different thing.

Mercury is in conjunction with the moon on December 4, at 7 h. 16 m. in the evening, when the planet will be 3 deg. north of the moon.

The right ascension of Mercury on December 1 is 16 h. 46 m. 48 s.; declination south 23 deg. 33 m. 20 s.; and on December 31 its right ascension is 20 h. 3 m. 46 s., declination south 22 deg. 10 m. 59 s.

VENUS.

Venus is evening star, and although its great southern declination robs it of much of its prestige, it is nevertheless a most regal object in the southwestern heavens.

No one can mistake this peerless celestial gem on the warm bosom of the early night.

Interest has been revived in the question of the axial rotation periods of Mercury and Venus by a recent announcement from Mr. Percival Lowell's observatory at Flagstaff, Arizona.

The result of his observations leads him to think that these planets make but one axial rotation in performing a revolution about the sun, thus confirming the work of the noted Italian astronomer Schiaparelli, who came to a similar conclusion about six years ago. Further particulars from the Lowell Observatory, which has unsurpassed facilities and conditions for these delicate observations, will be awaited with great interest.

Venus crosses the meridian on December 1, at 2 h. 29 m. in the afternoon, and sets at 6 h. 58 m. P. M.

On December 31 it crosses the meridian at 3 o'clock in the afternoon, and sets at 8 h. 2 m. P. M.

MARS.

Mars is in the eastern evening sky, on the first of the month rising soon after sunset, and is well placed for telescopic observation a few hours later. Its great northern declination is especially favorable.

Mars comes into opposition at midnight, on December 10, and it will be then at its nearest approach to the earth for this apparition. While the wonderful so-called canals must be left to the great telescopes, much detail can be seen on the planet with good instruments of moderate aperture under proper conditions of the atmosphere, or in "good seeing" as astronomers say. Much also depends upon good eyesight—a trained and educated vision. This usually comes with years of practice. Mars rises on the first of the month about 6 o'clock in the evening, and reaches the meridian three-quarters of an hour after midnight. On the last day of the month it rises at 5 h. 40 m. P. M., and reaches the meridian at 10 o'clock P. M. The right ascension of Mars on December 15 is 5 h. 6 m. 6 s.; and its north declination 25 deg. 39 m. 8 s. Its apparent motion is slowly retrograde through the constellation Taurus.

JUPITER.

Jupiter is in the morning sky, in the constellation Leo, and about twelve degrees eastward from the bright star Regulus in that constellation. Jupiter may now be observed telescopically to good advantage, reaching a fair altitude by three or four o'clock in the morning. Its wonderful belts and spots are already being studied by the enthusiastic students of this giant planet. Four of its moons will afford delightful and ever-changing telescopic pictures; while later, as it sweeps into nearer reach, the great instruments will attack the difficult fifth satellite.

I name herewith some of the interesting phenomena of the satellites which may be observed in December. On the early morning of December 2, the I satellite will transit, ingress at 1 h. 30 m. Egress of its shadow at 2 h. 35 m. Egress of the satellite at 3 h. 50 m. On December 3, at 1 h. 6 m., the I satellite will reappear from an occultation. On December 4 the IV satellite will disappear in eclipse at 3 h. 3 m. 38 s. On De-

December 6 the shadow of the III satellite will ingress at 4 h. 15 m. On December 16, at 4 h. 2 m., the shadow of the I satellite will enter on the disk. Ingress of the satellite I at 5 h. 14 m. Egress of the shadow of I at 6 h. 22 m. On December 21, at 1 h. 36 m. 44 s., satellite IV will reappear from an eclipse. On December 26 satellite I will reappear from an occultation at 1 h. 5 m.; and likewise satellite II at 2 h. 35 m. On December 31, at 5 h. 5 m. 28 s., satellite I will disappear in eclipse. At 5 h. 19 m. will occur the ingress of the shadow of satellite II; and at 6 h. 12 m. 40 s. satellite III will disappear in eclipse. It is understood that all these times are morning hours. On Christmas Day, at noon, Jupiter will be in conjunction with the moon, the planet being 3 deg. 38 m. north of the moon.

On December 1 Jupiter rises at midnight and crosses the meridian at 6 o'clock A. M. On December 31 it rises at 9 h. 35 m. and crosses the meridian at 4 h. 4 m. A. M. Through the latter part of the month Jupiter is apparently nearly stationary. On December 15 its right ascension is 10 h. 48 m. 7 s.; declination north 8 deg. 47 m. 23 s.

SATURN, URANUS AND NEPTUNE.

Saturn and Uranus are near each other in the morning sky, but too near the sun for good telescopic study. They are in conjunction on the morning of December 28, when Saturn will be 1 deg. 49 m. north of Uranus.

Neptune is in opposition to the sun on December 10, when it rises at sunset, and is well placed for telescopic observation later in the evening. The right ascension of Neptune on December 1 is 5 h. 13 m. 12 s., declination north 21 deg. 34 m. 4 s. On the last day of the month its right ascension is 5 h. 9 m. 30 s.; declination north 21 deg. 30 m. 9 s.

Smith Observatory, Geneva, N. Y., Nov. 21, 1896.

The Shore Road Drive in Brooklyn, N. Y.

Of all the many picturesque drives around New York Bay, there is none that presents a series of prettier marine pictures than can be seen from what is known as the Shore Road, which follows the meander of the eastern shore of the bay, from picturesque Bay Ridge, at Bay Ridge Avenue, to Fort Hamilton at the entrance of the Narrows. The present road, which has ever been a favorite haunt of the citizens of Brooklyn, follows very closely the sharp curvature and abrupt grades of the bluffs which overlook the bay at this point, and while these features may enhance the romantic beauty of the spot, they are too pronounced to be suitable to the necessities of a public driveway. The road, moreover, is at its best narrow and indifferently maintained.

The city commissioners have lately taken steps to improve the present road and turn it into a driveway similar to the well known Riverside Drive and Speedway in New York City, and the splendid twelve mile stretch of road in New Jersey known as the Hudson County Boulevard. The proposed improvements are to be carried out on a lavish scale, as may be judged from the fact that the preliminary purchase of the strip of water front, including the proposed road and lying between it and the bay, will cost in the neighborhood of two and a half million dollars. The water front thus acquired will be placed under the care of the Park Department of Brooklyn.

The work will be commenced at the Bay Ridge end, and in general the line of the existing road will be followed, the curvature being reduced and the grades lightened. The scheme provides for a fifty foot driveway, with a sidewalk six feet wide on the inside for the use of residents along the route. On the shore side of the road, immediately joining it, will be a strip of grass eight feet wide, planted with shade trees, and then a walk sixteen feet wide immediately on the edge of the bluffs. This plan will be followed as far as Ninetieth Street. From there to Fort Hamilton there will be a drive thirty feet wide along the top of the bluffs and another forty feet wide at the edge of the water. There will also be a sixteen foot walk and a twenty foot bicycle path at the edge of the water, which will follow the shore line for the whole two and one-quarter miles from Bay Ridge Avenue to the fort.

The ground between the driveways and walk on the bluffs and the shore line walk and bicycle path at water level will be tastefully sloped, terraced and planted. At the north end the drive will connect with a parkway, which is to be constructed from First Avenue to Fort Hamilton Avenue, and which, in order to avoid interruptions from surface line traffic, will be carried by tunnel or bridge across the intervening avenues from First to Eighth inclusive.

The work is being carried out under the care of Edwin C. Swezey, C.E., with William Jackson, C.E., of Boston, Mass., as consulting engineer.

The Testing of Smokeless Powders.

In the SUPPLEMENT for the current week (No. 1092) will be found a very interesting article on the testing of smokeless powders by Mr. Griffith, who has had a very extensive experience. This article is published by special arrangement with the English journal Arms and Explosives, and is specially recommended to all who are interested in explosives.

Mechanical Devices that Bring Evils in Their Train.

Just as the inventive genius of the age has forced novelties into the higher professions, and the expert mechanic finds his field growing larger continually, so the physician sees new or special diseases confronting him resulting from new conditions in modern life. These new diseases receive names from the lay world which are adopted by the scientific people.

Among the new maladies, says the New York Daily Tribune, which the physicians attribute to recent mechanical and scientific inventions is the "trolley foot." The motorman on electric and cable cars rings the warning gong by pressing his foot upon a knob or button, and it is said that the constant pressure produces an ailment which had never been known until the new cars came into use.

"In the first place," said a motorman, "it wears out the shoe quicker than you have any idea; but that's the shoe's fault. Then, tapping the knob produces a tickling sensation at first, and then the foot gets inflamed. Of course, we know that it can't be anything serious, and keep right on kicking the thing, and after a few days the inflammation wears off, the skin gets hard and we think it's all over and that we'll have no more trouble. But that's a mistake. Shooting pains and nervous twitchings follow, and these are worse when one is off duty than when kicking the gong." It was explained that in most instances the difficulty wears away, but that "trolley foot" had caused many men to quit the service of the railroad corporations.

Telephone ear, as a result of constant use of the telephone, has given the ear specialists considerable work. The structure of the ear is not in any way affected by the use of the instrument, but the unnatural use of the organ frequently causes a nervous strain, which is reflected in the aural nerves. When asked about the cure for the telephone ear an otologist said:

"I have never seen a case which was not cured in a short time after the cause was removed. When the patient stops using the telephone, the ringing noises and the headaches soon disappear."

Bicycle back and bicycle toes are among the ills which are charged to the improper use of the bicycle. "The man or woman," said a physician, "who doubles up on a wheel cannot escape the 'bicycle back' if he lives long enough, and the coward on a bicycle is apt to contract the 'bicycle toe,' which results from 'curling up' the foot. It is a strange thing," he added, "but it is true that the nervous rider, who constantly thinks he is about to tumble, will have excruciating pains in his toes after a short ride, and he will be troubled in that way until he gains confidence enough in himself to stop the nervous contraction of his feet. As to the 'bicycle back,' it is simply a natural consequence. The men who work in mines and who are compelled to stoop for hours at a time have what is known as 'miner's back,' which is identical with 'bicycle back;' but while we pity the miners, we condemn the wheelmen."

Telegrapher's cramp is another one of the modern complaints. It results from the manipulation of the telegraphic key, and affects the sufferer in the same way as writer's cramp. The fingers which are used on the key and the whole forearm are frequently made useless, and are restored to a normal condition only after scientific treatment by gymnastics and massage.

Typewriter's cramp is much like the telegrapher's cramp, but as both hands are used in writing on the machine, so both hands are often involved in the abnormal condition.

The Convention of the American Society of Mechanical Engineers.

The New York convention of the American Society of Mechanical Engineers was opened on the evening of December 1, when Mr. John Fritz delivered the presidential address, taking for his subject "The Progress in the Manufacture of Iron and Steel in America, and the Relations of the Engineer to it." The papers which are periodically read at these meetings form some of the most valuable contributions to the technical literature of the country, and it is needless to say that the contributions on this occasion were fully up to the traditions of the society.

By the courtesy of the secretary, Mr. F. R. Hutton, we are enabled to print the first paper of the series in the current issue of the SUPPLEMENT. It is from the pen of Sir Henry Bessemer and is entitled an "Historical and Technical Sketch of the Origin of the Bessemer Process." The distinguished metallurgist gives in full detail the various steps by which he was led to the discovery which has made him famous; and the recital is rendered very clear by copious illustrations, among which are cuts of the reverberatory furnace in the operation of which he first observed the possibility of decarbonizing cast iron solely by the air blast, and also of his early converters. The paper is timely, and in view of the recent discussion of Bessemer's claims to the process, will excite widespread interest. In subsequent issues of the SUPPLEMENT we shall publish several other papers from the series that were read at the late convention.