

vided a constant electric potential available at any moment is maintained.

Other things being equal, it is a question still unsettled whether the weights of an electrical equipment will overbalance a steam auxiliary. It is feared in some quarters that it may, and thereby necessitate sacrifices in such important elements in our ships as speed, armament, and protection. It is supposed that the inefficiency of the proposed new cruisers of the "Denver" class may be due in some measure to the electric auxiliary idea having been pushed too far.

The importance of providing increased docking facilities is emphasized by the fact that not only will the number of battleships in commission be doubled in the near future, but the time is approaching when extensive repairs may be necessary upon the earlier ships. Now, while the completion of the new dry docks will relieve the immediate situation, the present programme does not affect the two most important dockyards, namely those at New York and Norfolk where, in each case, a new dock capable of receiving the largest vessels is urgently needed. The same difficulty is confronting the Navy Department with regard to our rapidly growing fleet of torpedo boats and destroyers, although in this case it is thought that the docking problem can best be met by the construction of marine railways. Torpedo boats, because of their light plating, require frequent inspection of the bottom to detect corrosion. At present it is necessary to dock these diminutive craft in the large dry docks—a manifest waste of time and money, especially when these docks are in urgent demand for the battleships and cruisers.

The report, after emphasizing the need for improved and extended repair facilities at naval stations, closes by calling attention to the need for an enlargement of the corps of naval constructors. It is stated that the amount of work done in the last two years is plainly out of proportion to the number of officers in the corps, and has only been accomplished by overwork on the part of individual officers. We are of the opinion that there is no recommendation in the whole report that demands more immediate attention than this. In spite of the rapid growth of our navy of late years, and especially in the last two years, the total number stands at the old limit of forty, which is all that are allowed by law. Anyone who, like ourselves, was witness of the enormous amount of work taken in hand and successfully put through during the past eighteen months at the Brooklyn navy yard by Constructor Bowles and his assistants, will be prepared for the statement that this important branch of the service is sadly overworked.

THE HEAVENS IN NOVEMBER.

BY GARRETT P. SERVISS.

The expected return of the main body of the November meteors dwarfs every other astronomical event this fall. The splendor of their display, in 1833, made so deep an impression that they have ever since occupied a place apart in the popular imagination as the most gorgeous and startling of all celestial pageants. The fact that three of their periods measure just the span of a century tends to add to their reputation as a spectacle. Although their returns are separated by a space of thirty-three years and a fraction yet they may be seen three times in the course of a man's life. One who saw them as a child, in 1833, might have regarded their fiery menace with the cooler judgment of a middle-aged man in 1866, and, this year, may behold again the scene that marked the start and the turning post of his life with ineffaceable memories of wonders in the heavens.

But, while everybody hopes for a brilliant spectacle on this occasion, there are reasons for anticipating a possible disappointment. In 1866 the display, although imposing, was by no means as wonderful as it had been in 1833. The fact that the meteors were almost as abundant in 1867 as in 1866 showed that they were being scattered along their path. Later investigations indicate that this scattering of the meteors has probably continued ever since. The planet Jupiter, the great perturber of the solar system, has had his hand upon them. They are apparently traveling in several shoals, or parallel streams, and it may be that when the earth crosses their line of march it will fail to pass through any very dense column of the wanderers.

Yet, at the worst, it is certain that there will be a meteoric "shower." There may be only a hundred, or a few hundred, visible in an hour, or there may be many thousands. One unfortunate circumstance will be the presence of a strong moonlight, which will suffice to conceal many small meteors and to rob the larger ones of much of their brilliance. The maximum of the display is generally expected soon after midnight on the morning of November 16, and at that time the moon will be within twenty-eight hours of the full phase. At 1 o'clock A. M., November 16, the moon will be in the constellation Aries, about two hours west of the meridian, while the radiant point of the meteors, in Leo, will be about two hours from its rising point in the northeast.

While the best attainable information points to the first hour of the morning of November 16 as the time

when the meteors will be most numerous, yet the data are so uncertain that all observers are advised to be on the watch forty-eight hours earlier. Begin say at midnight on the 13th, and watch until dawn. Resume watching on the following night, and so on until the morning of the 17th. Every watcher for the November meteors on this occasion can have the satisfaction of knowing that his, or her, vigil is being shared, all over the civilized world, by thousands of the brightest spirits, which now inhabit the earth. The solution of the mystery of the November meteors will stand, in the perspective of a thousand years, high among the achievements of man.

The watch for the meteors will inevitably call many unaccustomed eyes to the starry heavens, and luckily the constellations on view include several of the finest. Like the meteors, however, the stars will suffer from the effulgence of the moon. At midnight in the middle of November the eastern half of the firmament is especially beautiful. Nearly overhead glitter the Pleiades, a silvery swarm. A little eastward appears the V-shaped figure of the Hyades, containing the red Aldebaran, marking the eye of the great bull Taurus which the imagination of the constellation makers pictured in the act of charging down upon the giant hunter Orion. The latter appears below the Hyades, toward the southeast, the uplifted "lion's skin," marked by a curving stream of small stars, being interposed between the hunter and the bull. Two brilliant stars, the brighter, Betelgeuse, of an orange tint, being the farther east, mark Orion's broad shoulders. A sparkling group above indicates his head. His beautiful belt, symbolized by three fine stars in a straight row, next catches the eye, while below the belt a splendid lone star, Rigel, shines in the giant's upraised foot.

An imaginary line drawn through the stars of the belt, and continued some twenty degrees toward the left, will point out the brightest star in all the heavens, Sirius, or the Dog Star. Northward from Sirius, and somewhat farther east, shines the lone first-magnitude star, Procyon. Above Procyon, but toward the west, are the twin stars of Gemini, Castor and Pollux. Between Gemini and Taurus flows the Milky Way, which makes its appearance north of Sirius in the east, and, crossing the heavens, disappears when the Northern Cross is setting in the northwest. North of Taurus and in the edge of the Milky Way is the brilliant white star Capellor. West of this is a curved row of stars, in a bright part of the Milky Way, belonging to the constellation Perseus, and below Perseus, also immersed in the Milky Way, is the zigzag figure of Cassiopeia and her chair. Half way down the western sky is the great square of Pegasus, and extending from one corner of the square toward Perseus, is a row of second-magnitude stars belonging to Andromeda. The Great Dipper is low in the northeast, standing on its handle.

THE PLANETS.

The remarkable assemblage of planets in the constellation Libra, to which attention was called in October continues. At the beginning of November Mercury, Venus, Mars, and Jupiter are all in that constellation, while Uranus is about 10° and Saturn about 25° east of its borders. All of these planets are too near the sun for satisfactory observation. Mercury and Venus, however, are moving away from the sun, and on the 16th the former attains its greatest eastern elongation, but it is so far south that it will not be conspicuous as an evening star. Venus will be seen in the southwest after sunset at the end of the month. A notable series of planetary conjunctions begins on the morning of the 4th, when Mercury and Mars meet. On the evening of the 8th Mercury and Uranus are in conjunction. On the morning of the 13th Mars and Uranus are in conjunction, and at noon on the 14th Venus and Uranus. On the forenoon of the 16th there is a conjunction of Venus and Mars, and on the forenoon of the 26th a conjunction of Venus and Mercury. On the afternoon of the 27th Venus meets Saturn, and on the afternoon of the 30th Mercury and Mars are in conjunction for the second time during the month. As these various conjunctions occur while the planets concerned are crossing the astrologically condemned region of Scorpio the high priests of superstition may be expected to make the most of them.

THE MOON.

New moon occurs on the morning of the 3d, first quarter on the morning of the 10th, full moon on the morning of the 17th, and last quarter on the morning of the 25th. The moon is nearest the earth on the forenoon of the 12th, and farthest from the earth on the evening of the 24th.

DEATH OF ADMIRAL COLOMB.

Vice-Admiral Philip Howard Colomb died October 14 at his residence in Botley, Hampshire, England, in the sixty-ninth year of his age. Admiral Colomb was one of the greatest authorities on naval affairs, and especially on the evolution of war vessels. He invented and secured the introduction of many of the devices which are now regarded as indispensable in modern warships. His first important invention was a system of flash signals for the British army which was adopted in 1859. In 1867 a system of flash signals for the navy

was adopted and it is now used in every navy in the world. His system of interior lighting for warships was invented in 1873 and it is now universally used where the electric light cannot be obtained. He was the author of many professional and popular works.

A NEW ZEALAND VESUVIUS.

For many years visitors touring through New Zealand never thought of leaving that country without first making a pilgrimage to the terraces of the Hot Lake district, about 180 miles distant from Auckland. This wild and curious territory is described by Mr. G. R. Falconer in the last number of *The Windsor Magazine*.

The white terraces of Rotomahana rose up in a series of twenty platforms in the form of a gigantic stairway. Each terrace was perfectly horizontal and of dazzling whiteness. The top step was vertically 80 feet above the base and sat 300 feet back. From every platform bubbles copious clouds of steam. A stream of boiling water continually flowed from the geysers and as it fell slowly from tier to tier the silicates with which the water was heavily charged became deposited, on its exposure to the air in wonderful lace-work designs of infinite variety and of dazzling whiteness and purity were formed. Not far from the white terrace was another termed the "Pink Terrace" where, owing to some coloring substance in the silicious waters falling from the geysers, the deposits were of a delicate pink hue from which was derived the name "Pink Terrace."

Unfortunately New Zealand no longer possesses this unique spectacle for the terraces are no more. The various agencies of nature which originally built up such curious forms served in turn to destroy them. Mr. Falconer gives a graphic description of the event. He was residing at that time about 40 miles distant from Tarawera. In 1886, on June 10, the night was clear and calm. Heavy rumbling sounds like rolls of distant thunder filled the air but there was no very great alarm. The next day dawned dull and gloomy. About half-past seven o'clock the morning grew darker and light gray ash, very fine, began to fall. He says that although they surmised an eruption was taking place in the Hot Lake district, there were no definite tidings to that effect so that he could only wait to see what would happen. By the aid of a lantern he succeeded in groping his way to the telegraph office, and there he learned that a serious disturbance was taking place at Tarawera and Rotomahana. About eleven o'clock the darkness lifted. All round the ground was covered with a thin filmy pall of fine ash to the depth of half an inch and it was afterward found that the intense darkness was caused by a thick cloud of dust blown out by the volcano to a height so tremendous that it passed above Tauranga and dispersed over the country some miles away.

The manifestation was accompanied by intense cold, the thermometer registering 5 degrees of frost. This is explained by the fact that the columns of steam as they came hissing out of the craters, expanded as they ascended and absorbed their own heat which became latent so that the heat was abstracted from everything near. A day or two later the Government geologist arrived at Tauranga and preparations to inspect the seat of the disaster were pushed rapidly forward. On the fourth day after the eruption, the party arrived at Wairoa the Maori village. There was scarcely a vestige of the settlement to be seen, the whole village had been crushed beneath the volcanic lava and the charred and battered remains of the little village church and other buildings protruded above the surface of the deposit, which at first, measured 4 feet in thickness, but afterward settled down to half that depth. One young Englishman was killed as well as the Maoris who lived in the district and exacted tolls from visitors to the Hot Lakes. The scene was the wildest imaginable. The air rushed over the land with cyclonic fury, uprooting, tearing and breaking trees that had survived the hail of rocks leaving here and there a gnarled and jagged trunk denuded of branches and stripped of its bark.

The next day the party set off for Rotomahana. As they approached the Hot Lakes huge cracks extending hundreds of yards in length and about a foot in width were seen in all directions. The scene was one of the strange grandeur of absolute desolation. The upheaval of nature had blown the wonderful terraces to atoms; steam was rising in dense clouds from one end of the area to the other, a distance of about nine miles. Rotomahana Lake was a yawning caldron from which rose a majestic column of steam. The ground was completely stripped of vegetation and covered with lava from the mountain. The lava was reduced to the consistency of flour so that the explorers sank in it nearly to their knees. Thus in the space of time was North Island suddenly shorn of its most peculiar natural features. In six hours the whole aspect of the country was changed, and what was one of the most beautiful spots in the world was transformed into a barren country carpeted in lava and covered with debris. The geysers, however, still abound in profusion, and it is possible in time other terraces may be formed.