

the ship made fast at her pier, her deck, sides, masts, and rigging were coated with many tons of ice, the weight of which, being placed so high above the water-line, materially affected though not endangering the stability of the ship, especially as the unloading progressed. On Monday, while she was coaling from barges alongside, she had a heavy list to starboard, which increased ultimately to 8 degrees, when coaling was discontinued on the starboard side and carried on through the port side, the starboard ports being left open. At 9:30 P. M. a heavy gust of wind careened the ship to port, and assisted by the weight of the ice aloft, heeled the vessel sufficiently to let the water in by the coal ports. After an unsuccessful effort had been made to close the ports the ship righted herself and took water in by the starboard ports also. Before anything could be done to save her, the vessel was down on the mud.

Cofferdams are being built around ports and hatchways, and an effort will be made to pump the ship dry. The wrecking company are fully confident of their ability to float her within a few days.

The "Germanic" was the pioneer vessel of the modern type, and since her maiden trip in 1875 she has crossed the Atlantic 600 times, covering a total distance of about 1,800,000 miles, or sufficient to carry her around the world on a great circle 75 times. She has carried some 60,000 saloon and 200,000 steerage passengers, and to the credit of her builders and officers it can be said that she has never, in all the twenty-five years of her service, met with a serious mishap. In 1894 she was re-engined and refitted at a cost of \$250,000, and to-day she is faster by a knot per hour than she was a quarter of a century ago.

THE HEAVENS IN MARCH.

BY GARRETT P. SERVISS.

The first month of spring witnesses the retreat of the constellations which formed the glory of the midwinter nights. The early evenings of March are not entirely deprived of the presence of Sirius, Orion, and their splendid attendants, but these stars are on their downward way, and, as they approach their setting place, they do not sparkle with the dazzling beauty that characterizes them when they are mounting from the east or crossing from the meridian in the crisp air of January or December. At 9 o'clock P. M., in the middle of March, they are all in the western half of the sky, while far less brilliant star groups occupy the zenith and the east. Leo is near the meridian, with Hydra stretched across the south, and the quadrilateral of Corvus rising well above the eastern hills. Behind Corvus come the leading stars of Virgo, while Arcturus glows redly in the northeast, and the Great Dipper is conspicuous between Arcturus and the pole.

THE PLANETS.

Mercury is an evening star, reaching its greatest elongation east of the sun on the 24th, when it will set nearly two hours after sundown. It should be easily seen in the western twilight for several days before and after that date. It may interest those who wish to test their powers of vision by trying to see the markings on Mercury to learn that at the Flagstaff Observatory the magnifying power usually employed in studying that planet and Venus is only 150 diameters on a 24-inch telescope. But diaphragms are employed to cut down the aperture to three or four inches, with great gain to clearness of seeing when such bright objects are to be viewed.

Venus is a morning star, and still brilliant, although gradually losing magnitude as she retreats from the earth. She rises between 4 and 5 o'clock in the morning, and moves in the course of the month from Sagittarius into Aquarius.

Mars, which distinctly outshone its neighbors Castor and Pollux, in Gemini, during the winter, is yet conspicuous and well worth studying with a telescope, although not much detail can now be seen on its disk. It will be interesting during the month to watch the motion of the planet with reference to the two stars. Mars rises about noon and sets in the small hours of the morning, so that it can be seen all night long. It is on the meridian, at the opening of the month, about a quarter before 9 o'clock.

Jupiter, the king of the planets, now in the western edge of the constellation Libra, rises at the beginning of February about 11 o'clock P. M., and, at the end of the month, about 9 o'clock. It is accordingly coming into fairly good position for observation. Prof. Hough has recently pointed out that there is a prevailing misconception as to the rotation of Jupiter. He himself thought in 1882 that the rapidity of rotation varied with the latitude, as on the sun. Now he concludes (and he has studied the planet assiduously for twenty years) that the different rates of rotation observed on Jupiter depend rather on the level of the markings than on their latitude. There are two principal rotation periods—9 hours 50 to 51 minutes and 9 hours 55 to 56 minutes—and spots are occasionally seen moving at these two different rates in nearly the same latitude. Usually, however, the shortest period is found only within a distance of about 9° north or south of the equator,

although it is not confined to that region. The swifter moving spots, Prof. Hough thinks, are the more elevated. Fortunately for those who desire to satisfy their curiosity about this grand and puzzling planet, many of the markings on Jupiter can easily be seen with good three and four inch telescopes, and with a five or six inch glass observations of decided scientific value may be made.

Saturn is in the lower part of Ophiuchus, between Scorpio and Sagittarius. It is a morning star, rising, in the middle of the month, about 2 A. M.

Uranus in Ophiuchus, about 5° north of the red star Antares, rises one hour before Saturn.

Neptune in Taurus is too faint for recognition by the naked eye.

It is interesting to note that the new asteroid discovered by Dr. Witt last year, which at times approaches the earth many million miles nearer than Venus is at inferior conjunction, has at last received a name from its discoverer. He has chosen to call it Eros, though a very small planet, is likely to play a very important part in the future history of astronomy.

THE MOON.

March opens with the moon approaching last quarter. New moon occurs on the 11th; first quarter on the 18th; and full moon on the 27th.

THE SUN.

The sun enters Aries, and the astronomical spring begins, on the afternoon of March 20. We appear to be, at present, close to the minimum sunspot period, and those who accept the view that at such times extreme contrasts in weather conditions are likely to prevail will be encouraged by a review of the meteorological records of the past winter, especially when taken in connection with those of the summer of 1898.

WORK OF THE WEATHER BUREAU.

Each year a concise report of the Chief of the Weather Bureau gives an idea of the splendid work which this bureau is doing. During the latter part of the fiscal year which ended June 30, 1898, it became apparent that the methods of gathering information of the approach of the West Indian hurricanes, which serve so admirably as warnings for the Gulf and Atlantic coasts, were wholly inadequate for a service which should cover the waters of the West Indies in which upward of two hundred naval and transport vessels of the United States were operated. The presence of this large fleet in the hurricane region made it imperative that precautionary measures should be taken. Accordingly a bill was submitted to Congress on January 16, 1898, authorizing the bureau to establish and operate observation stations throughout the West Indies and along the shores of the Caribbean Sea, and this bill became a law, and arrangements were made for making meteorological observations and displaying hurricane signals at Kingston, Santiago de Cuba, Santo Domingo, Barbados, Port of Spain, St. Thomas, Curaçoa, and Barranquilla. At the above named places observations will be made twice daily and cabled to Kingston and the central office in Washington. Even during hostilities Prof. Carbonell forwarded daily reports from Havana, which were especially gratifying to officials of the bureau as well as to scientists all over the world. Although the protection of our naval forces was a primary object in the extension of the storm warning system to the West Indies, other considerations scarcely less important made the step a wise and beneficent one. Now that the exigencies of war permit the removal of a greater part of the fleet from West Indian waters, the meteorological service will still serve a useful purpose in the protection it will afford to the commerce of that very extensive region.

Steps have been taken to equip about thirty stations in the Mexican republic by that government with the most modern type of meteorological instruments and to establish a service similar to our own. Additional observation stations have been established in arid and subarid regions of the West. It is believed that the additional stations will not only assist in the development of agricultural and industrial interests in the respective States in which they are located, but will also be of material benefit in improving warnings and forecasts, specially for the regions west of the Rocky Mountains.

The work of producing a thoroughly satisfactory kite was begun in the latter part of 1895. Various forms of kites were devised and thoroughly tested and many valuable laws relating to the strength and efficiency of the kites were developed. The kite finally adopted for practical work was an improved form of the Hargrave cellular type. A popular idea prevails that any one possessed of a few materials and a little ingenuity can construct a thorough-going kite. This is not true as regards the present Weather Bureau kite. The size and construction of every detail have to be worked out with reference to the several strains at the different points, securing thereby the maximum strength with the minimum weight. Suitable forms

of automatic registration apparatus have also been devised. Sixteen stations have been equipped with kites and other necessary instruments, and the observers chosen for the work were, with three exceptions, drawn from the list of eligibles from the Civil Service Commission. These men were called to Washington and given a practical course of instruction in the art of flying and managing kites. The period of construction extended from the 17th of March to the 18th of April. If each station had made an ascension daily during June, five hundred and ten ascensions could have been made, whereas two hundred and seventy-eight actual ascensions were made, in each of which the elevation attained exceeded 1,000 feet. The Weather Bureau kite stations are now in a position, as far as means and appliances are concerned, to obtain a complete series of observations. It is expected that the kite observations will add largely to our knowledge of temperature of the gradients aloft, and thus contribute to the solution of the problem of reducing barometer readings on the plateau to sea level.

As is usual, all forecasts and warnings issued by the department are of the greatest possible value to the community at large. The true measure of efficiency of the Weather Bureau is found in the promptness and accuracy with which notice of the approach and force of severe atmospheric disturbances is given. The efficiency of the bureau during the year 1897-98 was fully up to the high standard of the previous year. Hurricanes, wind and snow storms, freezing weather, and floods were heralded by timely and accurate warnings, and undoubtedly saved many lives and a vast amount of property. The distribution of the forecasts was in accordance with methods tried and proved by the experience of previous years. The daily press, the mail, telegraph, telephone, railroad bulletins, etc., were utilized to the greatest possible extent; and forecasts, warnings, maps, and bulletins were issued and distributed to the extent of 23,531,500, which is a most remarkable showing; 5,239,800 weather maps of all classes were issued, and 108,600 bulletins were distributed during the year. Each map or bulletin contains daily forecasts and statistics showing the weather conditions over some part of the United States. In the large cities the map contains a large number of reports. These are exposed on bulletin boards, etc., by boards of trade, business houses, and public offices. There is also a very considerable number issued to the schools and colleges for purely educational work. Climatic work was carried on in the cotton, corn, and wheat regions, consisting in reporting the daily temperature and rainfall at 129 stations in the cotton region and 131 in the corn and wheat region. The establishment of an agricultural experiment station in Alaska in April, 1898, led to the detail of an official of the Weather Bureau for duty in organizing a climate and crop service in that territory. The central station of the new service is situated at Sitka, at which point continuous observations are registered. Various publications and The Monthly Weather Review were continued.

Among the interesting features of the scientific work carried out by the bureau were observations on the rainfall and outflow of the great lakes, minute oscillations by the great lakes, and meteorological chart of the great lakes. In 1891, 633 miles of telegraph lines on the sea coast and frontier were turned over to the Weather Bureau as appropriate to a purely meteorological service. These lines traverse thinly settled regions or connect islands with the mainland by submarine cable at points where there is not enough commercial business to warrant the construction of a private line. These lines serve a double purpose. First they enable the bureau to receive early information of changes in the weather of exposed points on our coast, and they permit of display of storm warnings near several of the great highways of vessels leaving or entering our ports.

Instruction given in meteorology in the United States varies in its character as the subject is considered as a part of a course in climatology and geology, or a course in mathematics and physics. The former method of treatment is appropriate to high schools and to those who contemplate becoming observers in the Weather Bureau. The latter method of treatment is appropriate to those in universities, and should fit one for the prosecution of important work in dynamic meteorology. The importance of the subject has been kept in mind specially in the assignment of observers to duty at points where there are colleges and universities not already provided with instructors in meteorology. Prof. Cleveland Abbe, editor of The Monthly Weather Review, has been requested to prepare a report of the general conditions of the subject in the United States. A meteorological observatory has been erected at Columbia University, and a complete course of instruction in this subject will undoubtedly follow. Important improvements in experimental equipment were also introduced during the year, and classes of students visit Weather Bureau stations regularly, and advantage is taken of this opportunity to instruct large numbers of pupils in the use of meteorological instruments, as well as the methods of observations and general work of the bureau.