

the transmission of wireless dispatches across the British Channel during the last six months.

The instruments will be placed on the "Grande Duchesse," of the Plant line, upon the upper deck of which a tall pole, extending 60 feet in the air above the water line, will be placed, and a running account of the races will be telegraphed by Marconi and his assistants. On board the cable ship anchored near Scotland light a similar pole will be erected, and here two expert operators will be stationed to receive the message after it has been transmitted from the "Grande Duchesse." From the cable ship the message will be transmitted by means of submarine and land wires. The steamer "Ponce" will also be equipped with wireless telegraphy apparatus, the system of Mr. W. J. Clarke being used.

Rear-Admiral Bradford, Chief of the Bureau of Equipment of the Navy Department, has been informed that Signor Marconi will go to Washington to discuss with him the proposed experiments with wireless telegraphy. Admiral Bradford will recommend that one of the vessels of the navy be set aside for experimental work. It is proposed to place the receiver on shore, and the warship will communicate with it from varying distances. By this means it is believed the system will be developed and the value of it will be definitely determined.

SOME CALENDARIAL FACTS ABOUT THE TWENTIETH CENTURY.

When will the twentieth century begin? Why there should be different answers to this question is a little puzzling to know. A few fundamental facts disposed of, ought easily to settle the controversy. Of course, the first century began with the year 1, and closed with the year 100. The second century, then, began with the year 101, and closed with the year 200. Now, following this method to the present time, there can be but one answer to the above question. The nineteenth century closes with the year 1900, and the year 1900 closes December 31. Immediately after midnight, therefore, of December 31, 1900, is when the twentieth century begins. In other words, it begins with the first second of the first hour of the first day of January, 1901.

Just at the very nick of time when the twentieth century begins at the international date line, the nineteenth will still be enveloping, as it were, the entire globe; but twelve hours afterward, it will be the twentieth century on half the earth and the nineteenth on the other half; twelve hours later the nineteenth will have entirely passed, and the twentieth will have made its first circuit round this ball on which we live. Thus it takes a century a full day's time to get complete possession of affairs, and from the time of its very beginning to the point where its last trace disappears occupies just 100 years and 1 day. This is evident from the fact that after a new century has begun on the earth, it still takes the preceding century full twenty-four hours to give way entirely to the new.

The twentieth century will open on Tuesday and close on Sunday. It will have the greatest number of leap years possible for a century—twenty-four. The year 1904 will be the first one, then every fourth year after that to and including the year 2000. February will three times have five Sundays; in 1920, 1948 and 1976. In 1901, Decoration Day, Fourth of July and Thanksgiving Day will occur the same day in the week. Then, after that, the same thing will happen at the following intervals: 6, 11, 11, 6, 11, 11, and so on, years; or in 1907, 1918, 1929, 1935, and so on. In the years 1912, 1940, 1969 and 1996, there are four holidays that will fall on the same day in the week: the three already mentioned and Washington's Birthday Anniversary, as also the 29th of February. Thanksgiving Day and Christmas will occur on the same day in the week in 1906, and then at successive intervals of 11, 6, 11, 11, 6, 11 years, and so on; also in 1928, 1956 and 1984. March 4 will fall on Sunday in the inaugural years 1917, 1945, and 1973.

The same yearly calendar that was used in 1895 can be used again in 1901, after which, at successive intervals of 6, 11, 11 years throughout the century; that for 1890 again in 1902 and at intervals of 11, 6, 11 years; 1891, again in 1903 and at intervals of 11, 11, 6 years; 1892, in 1904 and at intervals of 28 years; 1899, in 1905 and at intervals of 6, 11, 11 years; 1894, in 1906 and at intervals of 11, 6, 11 years; 1896, in 1908 and every 28th year thereafter; 1897, in 1909, and at intervals of 6, 11, 11 years; 1898, in 1910, and at intervals of 11, 6, 11 years; 1872, in 1912 and every 28th year thereafter; 1876, in 1916; 1880, in 1920; 1884, in 1924; 1888, in 1928; in the last four cases, also at intervals of 28 years.

The following are, in order, beginning with 1901, the dates of Easter for the first 25 years of the century; April 7, March 30, April 12, 3, 23, 15, March 31, April 19, 11, March 27, April 16, 7, March 23, April 12, 4, 23, 8, March 31, April 20, 4, March 27, April 16, 1, 20, 12.

The earliest possible date on which Easter can occur is March 22. The last time it occurred on this date was in 1818, but it will not occur again till after the twentieth century. The latest Easter can occur is April 25, and it will thus occur but once in the coming century, in 1943. Whenever Easter occurs on March 27, or April 3,

10, 17, or 24, Christmas also occurs on Sunday. Though one of the objects aimed at by the church authorities who fixed upon the method of determining the date of Easter was to prevent its occurrence on the same day as the Jewish Passover, nevertheless the two events will occur together four times in the twentieth century, April 12, 1903, April 1, 1923, April 17, 1927, and April 19, 1931.

The twentieth century will contain 36,525 days, which lacks but one day of being exactly 5,218 weeks. The middle day of the century will be January 1, 1951. The day of the week that will not occur as often as each of the others is Monday. Fifteen out of the hundred years will begin on Wednesday and the same number on Friday. Fourteen will begin on each of the other days in the week.

The following is a special rule for finding the day in the week corresponding to any date of the twentieth century: Add together the number of the year of the century, one-fourth of one less than this number, neglecting fractions, and the number of the day in the year; increase this sum by 1, and then divide by 7. The remainder will indicate the number of the day in the week, Sunday being regarded as 1 and Saturday as 0. Thus in the case of July 4, 1980, we have as the number of the year of the century, 80; as one-fourth of one less than this number, 19; and as the number of the day in the year, 186, the year being a leap year. Hence, $80 + 19 + 186 + 1 = 286$, which divided by 7 gives 6 as a remainder. The day in the week is, therefore, Friday.

Several announcements are made of changes to be inaugurated with the opening of the new century. The first of importance is that Russia will adopt the Gregorian calendar. This will be done by omitting thirteen days, the amount of error that will have accumulated after the close of February, 1900. The Russians will then write January 1, 1901, instead of December 19, 1900, or rather instead of $\frac{\text{December 19, 1900}}{\text{January 1, 1901}}$ the dual

system now in vogue in that country and in Greece. The other important announcement is that it is not at all unlikely that the astronomical day, which now begins at noon of the civil day, will begin with the civil day, at midnight. The present method of having the astronomical day to begin twelve hours after the beginning of the civil day is apt to be confusing. On the other hand, to have the former begin at midnight, just when astronomers are often busiest, will be to them somewhat inconvenient.

As to eclipses in the coming century, there will be about 380 of them, the number of solar being to the number of lunar in about the ratio of 4 to 3. What is of very rare occurrence in a calendar year will happen in 1935, the first time since 1823, viz., seven eclipses, the largest possible number that can happen in a year. There are eight total solar eclipses predicted to occur, visible in the United States, in 1918, 1923, 1925, 1945, 1954, 1979, 1984, 1994. There will also occur twelve transits of Mercury on the following dates: November 12, 1907; November 6, 1914; May 7, 1924; November 8, 1927; May 10, 1937; November 12, 1940; November 13, 1953; November 6, 1960; May 9, 1970; November 9, 1973; November 12, 1986; November 14, 1999. The first, second, ninth and tenth will be wholly visible in the United States; the seventh and eighth only partially so. A transit of Venus, however, which is of much more consequence, will not occur within the next century. The earliest date predicted is June 8, 2004.

While it is claimed at least a thousand comets come within visible range of the earth within a century, there is reasonable certainty of the recurrence of but one extraordinarily conspicuous comet in the next century. That one is known as Halley's. It was last seen in 1835. It will be due again in 1910 or 1911; the exact time is not known, owing to slight modifications in its orbit due to planetary influence. It will probably recur again sometime near 1985. Of course, it is not impossible for some hitherto unobserved comet to appear in all its blazing glory at any time. No astronomer knows. Of famous meteoric showers there will probably be the three recurrences of the Leonids, in 1932, 1965, and 1998, as in the present century, one being yet due, November 13 of this year.

BENJAMIN F. YANNEY.

NEWS OF LIEUT. PEARY.

The Peary-Harmsworth steamer "Windward" has arrived at Brigus, Newfoundland, from Etah, North Greenland, and she will be followed by the "Diana" of the Arctic Club, in about a week. The two steamers met at Etah August 12, and worked in company under the direction of Lieut. Peary in collecting supplies for the winter and the equipment for next spring's campaign. Lieut. Peary and the sled parties were in the field almost continually from October, 1898, until August 6 of this year, and have effected an extraordinary amount of important work, adding much to the geographical knowledge of the coast line and to the interior of Ellesmere Land. The sledging journeys aggregated more than 1,500 miles. Lieut. Peary made a careful reconnaissance of the coast line southwest of Allman Bay, and carefully defined the lands between

that point and Cape Sabine. The "Windward" was icebound in Allman Bay on the west side of Kane Basin from August, 1898, to August 2, 1899. Lieut. Peary made several very successful hunting trips and in December he sledged 250 miles north to Fort Conger, the headquarters of the Greely expedition. He had the misfortune to have both his feet frostbitten, which caused six weeks' delay and confinement until he could make the return trip.

He was hauled all the way back to the "Windward" where several toes were amputated. This was followed by complete recovery, and he now walks as well as ever. Peary was the first to visit Fort Conger since Greely left it in 1883. He brought away and is sending home the original Greely records, the sextant of the Nares-Markham expedition of 1876-78, and many private letters and papers of members of the Greely party. The records can only be regarded as relics, as Gen. Greely had brought three copies of them to the United States. Lieut. Peary also conducted a reconnaissance beyond Fort Conger to Cape Beechey. Subsequently he made a second trip to Fort Conger, and four parties in all reached that point from the "Windward."

The winter is now settling down over his camp at Etah on the Greenland coast east of Smith Sound. It is a good place for a camp and is near the one where Dr. Hayes wintered in 1886. Peary has built a comfortable living and working room for himself and his companions, and during the winter he will collect more dogs for next season's campaign and prepare to resume his sledge work up the channels from Smith Sound as soon as the sun returns. The winter will be spent in rest and in working up the results of last year. The "Fram" wintered near Cocked Hat Island 10 miles west of Cape Sabine. She was released from the ice August 1, and reached Etah August 12, and left the same day for Cape Sabine. It is reported she will go to Jones Sound for the winter, unless she succeeds in getting beyond Kennedy Channel and landing Captain Sverdrup for a sledge trip across or around the northern end of Greenland, to be picked up on the east coast by the ship "Windward."

OBSERVATIONS OF POLARIS.

Prof. W. W. Campbell, on September 12, made the following statement in regard to his recent observations, by means of which he discovered that Polaris, familiarly known as the North Star, embraces three distinct bodies:

"The observations of Polaris," says The New York Times, "were made with the Mills spectroscope attached to the 36-inch telescope. From the well-known principle of the shifting of the line in the spectrum of a star, we can determine whether the star is approaching or receding from the observer and how rapidly. For most stars the velocity is constant. For some stars the velocity is variable, due to the attractions of companion stars.

"The recent observations of Polaris, at Lick Observatory, show that its velocity is variable. It is approaching the solar system now with a velocity of 8 kilometers per second. This will increase in two days to 14 kilometers, and in the next two days will decrease again to 8 kilometers. This cycle of change is repeated every four days. The bright Polaris, therefore, revolves about the center of gravity of itself and its invisible companion once in four days. The orbit is nearly circular and is comparable in size with the moon's orbit around the earth.

"This center of gravity, and therefore the binary system, is approaching the solar system at present with a velocity of $11\frac{1}{2}$ kilometers per second. A few measures of the velocity of Polaris made here in 1896 gave its approach at the rate of 20 kilometers per second. Part of this change since 1896 could be due to a change in position of the orbit of the binary system, but most of it must have been produced by the attraction of a third body on the two bodies comprising the four-day system. The period of revolution of the binary system around the center of gravity of itself and the third body is not known, but is probably many years.

"Both companions of Polaris are invisible, but their presence is proved by disturbances which their attractions produce in the motion of the bright Polaris."

GOVERNMENT AID IN FORESTRY.

The Division of Forestry, of the United States Department of Agriculture, has issued a circular stating that the division is prepared, as far as a limited appropriation will permit, to render practical and personal assistance to farmers and others by co-operating with them to establish forest plantations, wood lots, shelter belts, and wind breaks. An expert tree planter will have charge of the work, and he will be assisted by collaborators from the different States who are familiar with local conditions. It is proposed that visits be made by the superintendent or one of his assistants to the lands of the farmers desiring aid in forestry, and that working plans be given, including help in the selection of trees, information about planting, and instruction in handling forest trees after they are planted.