

ceding information, the *Nautical Almanac* gave, first for every day, and from 1861 for every two days, the ephemerides of all the planets for the time of their passing the meridian of Greenwich, information which French astronomers would have been happy to find in the *Connaissance des Temps* for the meridian of Paris. Let us add, moreover, that the positions of Neptune were only given in the *Connaissance des Temps* in 1861 (for 1863), while they were in the *Nautical Almanac* from 1857 (for 1861).

It was also in this same year, 1863, that the *Connaissance des Temps* gave for the first time the values of the constants of Bessel, intended to transform into apparent positions the mean positions of the stars given by the catalogues; as well as the elements of the occultations, according to Bessel, in a form which enabled voyagers to calculate, for the very place where they happened to be, the principal circumstances of the phenomena. The *Nautical Almanac* had published all this since 1834.

In 1864, the positions of the sun, which for many years were calculated with the tables of Delambre, reconstructed in part by M. Mathieu, were published according to the tables of M. Leverrier; the same was done for the positions of Mercury, and in the following year for those of Venus and Mars. The *Nautical Almanac* had used the tables of M. Leverrier since 1860 for the sun and Mercury (*Almanac* for 1864), since 1861 for Venus (*Almanac* for 1865), since 1862 for Mars (*Almanac* for 1866). On the other hand, the *Connaissance des Temps* for 1864 appeared in February 1863, and consequently six months after the *Nautical Almanac* for 1866. Finally, the *Connaissance des Temps* for 1864 contained the rectilinear co-ordinates of the sun referred to the plane of the equator; they are found in the *Nautical Almanac* from 1849.

This collection of reforms raised considerably the value of the *Connaissance des Temps*, which, it was unanimously agreed, had fallen very low as compared with foreign ephemerides. The reform accomplished in France in 1864 was analogous to that of the *Fahrbuch* in 1829 and of the *Nautical Almanac* in 1830. But even at the present time the *Connaissance des Temps* does not contain any ephemeris of Ceres, of Pallas, of Juno, nor of Vesta, which has appeared in the *Nautical Almanac* and the *Fahrbuch* since 1830; nor of any of the numerous small planets discovered since 1845, for which the other two works publish a supplement each year. Yet for a long time past the continued observation of these telescopic planets has formed one of the most important occupations of most of the observatories.

In 1870 the direction of the *Connaissance des Temps* passed into the hands of Puiseux, who, however, kept it for only a very short time. His period of office, nevertheless, was marked by an important improvement. He indicated, by a figure in the proper place, the day on which, in consequence of the difference of length between the sidereal day and the mean solar day, each star passed twice across the superior meridian of Paris. This was a sad omission; such an indication is found in the *Nautical Almanac* for 1822.

At present the direction of the *Connaissance des Temps* is entrusted to M. Lœwy; Mr. Hind has been superintendent of the *Nautical Almanac* Office since 1853, and Herr Förster succeeded, in 1864, the celebrated Encke in the direction of the *Fahrbuch* of Berlin.

TELEGRAPHING EXTRAORDINARY

AT the Telegraph Office, Washington, on Dec. 11, 1873, an experiment was carried out in the presence of Mr. Creswell, the Postmaster-General of the United States, the practical results of which will be of immense importance as regards the future of telegraphy throughout the world.

On that occasion the president's last annual message of 11,500 words was transmitted from Washington to New York, a distance of 290 miles, over a single wire in 22½ minutes, the speed obtained being over 2,500 letters per minute.

At New York the message was delivered from the automatic instrument printed in bold type in presence of the Postmaster of New York. This achievement in telegraphy is the more remarkable as the principle involved is not new, but was well known in 1848. The experiments made at that date were practically without result. By the new American combination of chemistry and mechanism the speed is apparently almost unlimited, messages at the rate of 1,200 words, or 6,000 letters, a minute being afterwards transmitted with equally satisfactory results.

Hitherto the speed attainable over circuits of similar length in this country by the Wheatstone automatic system, at present in use for the "high speed" service by the Postal Telegraph Department, does not exceed 200 letters a minute.

The new American instrument has a great advantage in the extreme simplicity of its construction, mechanical detail giving place to chemical action. One important result of this experiment is that it demonstrates that hitherto the speed of transmission of electric currents through a metallic conductor has been restricted from mechanical imperfections in the mechanism of the recording or receiving instrument, and that by the substitution of chemical decomposition for mechanical action, an almost unlimited speed of transmission may be obtained. It is to be hoped that this new transmitting and recording instrument may be the agent by which our present tariff of 1s. for twenty words, may be reduced to 6d., or less, for a similar message. Scientific progress, practically applied, is an heirloom to a nation.

NOTES

MR. HENRY LONSDALE is preparing a biography of John Dalton, the great chemist, and would be glad of any letters or other aid in his important work.

AT the meeting of the Paris Academy of Sciences held on Monday, January 5, M. Fremy was elected president for the ensuing year, and M.M. Chasles and Decaisne were elected to serve on the central committee.

A COMMITTEE, consisting of Lord Cathcart, Mr. C. Whitehead, Mr. Jabez Turner, Mr. Wakefield, Mr. Brandreth Gibbs, Mr. J. Bowen-Jones, Mr. W. Carruthers, F.L.S., and Mr. J. Algernon Clarke, appointed by the Royal Agricultural Society to carry into effect the suggestions of the judges of the potato disease essays held a meeting on Monday at Hanover Square. They will recommend the Council to offer three prizes of 100l. each for disease-proof potatoes. Competitors will probably be required to send in one ton of each variety by the middle of February. Each sample will be distributed among growers in many different parts of England, Wales, Scotland, and Ireland; and the produce of potatoes which resist disease during the first year's trial will be tested for two years longer. With a view of encouraging the production of new varieties, handsome prizes are to be offered also for disease-proof sorts raised from potato plums to enter into competition in the spring of 1879. The terms and conditions will be decided upon at the next meeting of the Council.

THE INDIAN MUSEUM, as it now stands, situated on the highest story of the India Office, has been found to be useless for all the purposes for which it was intended. It has therefore been resolved to erect on the plot of vacant ground in Charles-street, directly opposite the India Offices and facing St. James's Park, a new museum and public library. To this building,