

ology in Belgium by J. Vincent, meteorologist at the observatory, which contains exhaustive references to the literature of the subject, beginning in fact with Charlemagne, who promulgated and established the use of twelve compass points instead of the sixteen now used in the notation of the winds, viz, east, east by south, south by east, south, south by west, west by south, west, west by north, north by west, north, north by east, east by north, all which were sometimes known as the twelve apostles.

The most ancient name that can actually be cited in meteorological matters is Thomas of Cantimpré, who was born in Brabant in the early part of the thirteenth century and was the author of the work *Die Naturis Rerum*, which was finished about 1250 and often attributed to Albert the Great. The history of modern scientific meteorology in Belgium begins with Simon Stévin, born at Brussels in 1548 and died in Holland in 1620. His ideas as to gravity, hydrostatics, the fall of heavy bodies, the weight of the air seem to have been quite correct. He first gave two methods for determining the elevations of the clouds. In one method, assuming that the cloud is isolated in the sky and almost stationary, he measures the angular altitude of the cloud and takes a corresponding measure of the location of its shadow on the ground. In the second method he makes two measures of the angular altitude, from the extremities of a base line, the cloud being near the zenith. His ideas on geology and other branches of science were generally clear and correct. In Girard's translation of the works of Stévin he interpolates ideas of his own, such as the vesicular theory of cloud particles which was not at all known to Stévin. To another Belgian meteorologist, F. d' Aiguillon, born at Brussels in 1556, we owe the methods of projection known as orthographic, stereographic, and scenographic, as well as investigations into the optical phenomena of the atmosphere. Of later authors Fromondus (or Libert Froidmont), Fienus (or Feyenes), Vendelinus (or Wendelin), F. Linus (or F. Hall), Sluse (or R. F. Walter), L. Gobart, F. Verbiest, J. A. Brown, (born in 1702, died in 1768) are especially mentioned.

A chapter is devoted to the earthquakes observed in Belgium, of which the earliest occurred in the year 330, and the next in 502, but of course only prominent, destructive quakes are mentioned in the early records. At the present time every tremor is recorded by self-registering apparatus and the periodicities, both diurnal and annual, seem to be present.

After a section devoted to fundamental meteorological data and tables of reduction, the *Annuaire* gives an elaborate account of two ancient meteorological journals, one relating to the period 1778-1810, the other to the period 1807-1850. This is followed by an article on the climate of Ardenne, written at the request of the Belgian Department of Agriculture. These and several essays together make the *Annuaire* for 1901 an interesting contribution to meteorology.

OFFICIAL STANDARD TIME.

In the *Astronomical Annual* for 1901 of the Royal Observatory of Belgium, the director, Dr. L. Niesten, says that—

In the astronomical annals we shall continue to make use of local meantime until that very desirable epoch when astronomers shall agree to substitute civil time for it.

Civil time begins at midnight, and should be counted onward for twenty-four hours; astronomical time begins at noon, and is counted onward for twenty-four hours.

Official time in Belgium is the civil time for the meridian of Greenwich. This is the legal time used by government officials, railroads, and post offices, and may be called public or popular time. The legal time in other countries is stated

by Dr. Niesten, on page 159 of this *Annuaire*, to be as follows:

Western European time, or the civil time of the Greenwich meridian, is legal in England, Belgium, Holland, and Luxemburg. In Belgium the 24-hour notation has been used since May, 1897, in the post office, telegraph, and telephone departments, as also by the railroads and the navy.

Central European, or one hour east of Greenwich, is legal in Germany, Austria-Hungary, Bosnia, and Herzegovina, the Congo Free State, Denmark, Italy, Servia, Sweden, Norway, and Switzerland. In Italy the hours are counted from midnight on to twenty-four.

The meridian of one hour thirty minutes east of Greenwich is adopted by the railroads and telegraphs in Cape Colony.

Eastern European time, or the meridian of two hours east of Greenwich, is adopted by Bulgaria, Roumania, and Natal, and by the railroads of Turkey in Europe. The meridian of eight hours east of Greenwich is adopted by West Australia.

The meridian of nine hours west of Greenwich is adopted by Central Australia and by Japan.

The meridian of ten hours east has been adopted by Victoria, Queensland, and Tasmania.

The meridian of eleven and a half hours has been adopted by New Zealand.

As is well known, Canada and the United States and Mexico have adopted as standard hours the fifth, sixth, seventh, and eighth west of Greenwich. In Canada the notation from zero to twenty-four continuously has also been authorized.

The 24-hour notation has also been introduced into the railroads of British India, where the fifth and sixth hours east of Greenwich are commonly used as standard meridians.

The eighth hour east of Greenwich would be appropriate to the Philippines, but we do not know that the American authorities have issued any regulations bearing on this point.

The Hawaiian Islands adopt the meridian of ten and a half hours west of Greenwich.

The nations that have not adopted the Greenwich system are as follows:

In Spain the legal hour is that of the meridian of Madrid, or 14^m 45^s west of Greenwich; in Spain the 24-hour enumeration has lately been adopted.

Portugal adopts the time of the meridian of Lisbon, or 36^m 39^s west of Greenwich.

Russia adopts the meridian of St. Petersburg uniformly for its whole domain, or 2h. 1m. 13s. east of Greenwich.

The above data may differ slightly from that published elsewhere. In fact, it is difficult to gather correct statistics for all parts of the world, and the Editor will be pleased to publish any corrections or additions to this list.

It is important to bear these standards in mind when one wishes to compare the exact time of occurrence of any event that is observed in two different countries. We recall vividly a remarkable discrepancy in the hourly temperature records kept in a certain hospital where the morning readings were made by a subordinate who happened to be a Frenchman, and the afternoon readings by one who happened to be a German. The thermometer was unfortunately graduated in the Centigrade system on one side and the Réaumur system on the other. As a matter of course, the morning records were kept in the former and the afternoon records by the latter system. Nothing was said about this in the published records, and it took the Editor a long time to ferret out the cause of the discrepancies. Doubtless, analogous discrepancies are introduced every day by the differences between sun time, local mean time, and legal standard time. In proportion as we progress toward one absolutely uniform standard of time, such as Greenwich, we shall eradicate discrepancies and increase the accuracy of all work in terrestrial physics.

THE WORK OF THE METEOROLOGICAL INSTITUTE OF PRUSSIA.

The Meteorological Institute of the Kingdom of Prussia, (K. Preussische Meteorologische Institut), directed by Dr. von Bezold, includes: (1) The Central Institut of Berlin, divided into four sections: (a) Climatology and miscellaneous; (b) atmospheric precipitation and library; (c) storms, accidental atmospheric phenomena and instruments; (d) aeronautics;