

11. Considerable progress has been made in the adoption of the principles of universal time, and the practical success which has attended the application of these principles goes to show that the unification of reckoning by the several civilised nations can best be effected step by step.

Reckoning by Hour-meridians.

12. The first important step is the adoption of the "hour-zone system," commonly designated in America "standard time." It may be stated that in the theory of universal time the fundamental principle is unity. It is held that there is not more than one time in the whole universe, and that the idea of separate and distinct times in each separate locality is incorrect. While the essential principle of universal time is indisputable, it cannot be denied that a perfectly uniform notation of time throughout the entire globe comes into direct conflict with our preconceived notions and habits of thought. The hour-zone system is introduced as an easy means of transition from old to new ideas, and it is found that by adopting hour-meridians as local standards for reckoning, grave difficulties are in a large measure overcome without any violent departure from our inherited usages and prevailing customs. The hour-zone system also furnishes the means of applying the correct principles of universal time in ordinary affairs.

13. In the hour-zone system the circumference of the globe is divided into twenty-four sections or zones. The central line of each zone is an hour meridian, and the hour meridians are 15 degrees of longitudes apart. A chart of the world on Mercator's projection can be made to show the geographical position of the twenty-four-hour meridians. They are numbered in consecutive order towards the west from zero, the ante-prime meridian.

14. The hour zones theoretically extend $7\frac{1}{2}$ degrees of longitude on each side of the hour meridians, but in practice that is by no means an essential rule. The boundary-line of contiguous zones may be governed by national, geographical, or commercial circumstances.

15. As the earth rotates on its axis in twenty-four hours, an hour elapses between the solar passage on each successive hour meridian. It is obvious therefore that, if the reckoning in each zone be governed by its respective meridian, the reckonings everywhere will be directly related. There will be differences, but the differences will in every case be known, and they will invariably be multiples of an hour. Throughout the globe there will be complete identity in the minutes and seconds. For example, when the reckoning in the tenth zone is six hours twenty-five minutes, in the eleventh zone it will be five hours twenty-five minutes, in the twelfth zone four hours twenty-five minutes, and so on, each successive zone differing by an exact hour. Thus the only departure from complete uniformity in reckoning around the globe will be in the numbers of the hours, but, the numbers of the hours being governed by the number of the hour meridians, the passage to universal time is simple and direct.

16. As the reckoning in the zone of the twelfth-hour meridian corresponds with universal time the reckonings in all zones to the east of that meridian will be one or more full hours in advance of universal time, and in all zones to the west of the twelfth-hour meridian the reckonings will be behind universal time. Universal time will be the mean of all possible reckonings under the hour-zone system and the universal day the mean of all possible local days.

17. The hour-zone system has been adopted for ordinary use in portions of the three Continents of Asia, Europe, and America. In 1887 an Imperial ordinance was promulgated directing that on and after the 1st day of January in the year following time throughout the Japanese Empire would be reckoned by the third-hour meridian. The reckonings in England and Scotland is by the twelfth-hour meridian; in Sweden the eleventh-hour meridian is the standard, and quite recently it has been resolved in Austria-Hungary to be governed by the same meridian. Efforts are now being made to follow the same course in Germany and in other European countries. In North America the hour-zone system has been in general use for six years, the reckoning of time being governed as follows, namely: By the 16th hour meridian in Nova Scotia and Prince Edward Island; by the 17th hour meridian in New Brunswick, Quebec, Ontario, Maine, Vermont, Massachusetts, New Hampshire, Connecticut, New York, Pennsylvania, Rhode Island, New Jersey, Maryland, Virginia, North and South Carolina, Georgia, Florida; by the 18th hour meridian in Manitoba, Kewatin, Minnesota, Wisconsin, Michigan, Iowa, Ohio, Illinois, Indiana, Kentucky, Missouri, Arkansas, Tennessee, Alabama, Mississippi, Louisiana; by the 19th hour meridian in Assiniboia, Saskatchewan, Alberta, Arthabasca, Montana, Dakota, Wyoming, Nebraska, Colorado, Kansas, New Mexico, Texas, Utah, Arizona; by the 20th hour meridian in British Columbia, Washington, Idaho, Oregon, Nevada, California.

18. The adoption of the hour-zone system has been the means of removing the chaos of local times, which, in many quarters, previously caused much friction. Wherever the reckoning is governed by the same standard meridian there is complete uniformity in every division of time. In Japan, Central Europe, Great Britain, United States, Canada, and Mexico identity of reckoning prevails. In all these countries the hours are struck at the same moment; the only difference is in the numbers by which they are locally known; with that single exception every division of the day is simultaneous.

The Twenty-four-hour Notation.

19. The second important step in regulating the reckoning of time throughout the world is to abandon the division of the day into ante-meridian and post-meridian hours, separately numbered, and to substitute a single series of hours numbered from 0 to 24. This change was resolved upon by the Washington Conference with respect to the universal day.

20. The old practice of dividing the day into separate sets of twelve hours, however it arose, has not only no advantage to recommend it, but the usage has been found to have positive disadvantages, which have been brought into prominence within the past generation. The division of the day into halves doubles the chance of error, and tends to confusion in connection with the running of railway trains. The misprint or error of a single letter, a.m. for p.m., or *vice versa*, will easily arise to cause inconvenience, loss of time, possibly loss of property or loss of life.

21. The twenty-four-hour notation, so called, removes all doubt and uncertainty, and promotes