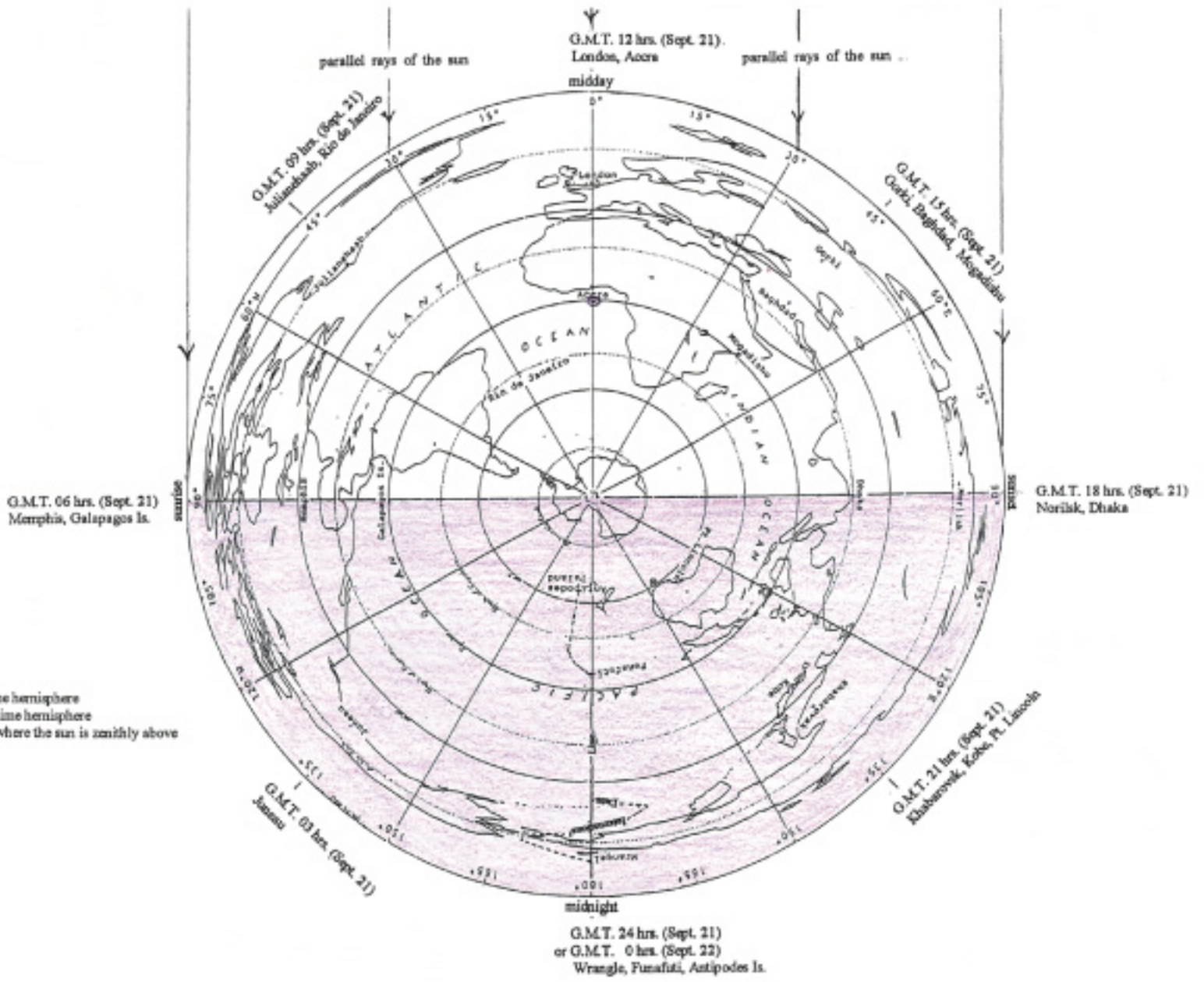
The Celestial Year-Clock

The face of the celestial year-clock is composed essentially of eight antipodes maps. Four of them are dated and timed approximately at the middle of the seasons, and the other four approximately between the seasons. They are all arranged in an orbital circle around the sun. The maps depict the migration of the daytime and night-time hemispheres on the earth's surface, which faithfully follow the apparent migration of the sun to and from the tropics, caused by the earth's tilted (23.5°) axial rotation and its simultaneous revolution round the sun. It is the recognition of the precise position of these migratory hemispheres that enable the maps of the celestial year-clock to tell the season and time in any part of the earth during a year. As the antipodes map is a southern perspective of the earth, the earth's rotation and revolution are both in clockwise directions. One complete revolution of the celestial year-clock shows the following intervals of time.

1 second = ($\frac{1}{86,400}$ of 1 rotation)
60 seconds = 1 minute ($\frac{1}{1440}$ of 1 rotation)
60 minutes = 1 hour ($\frac{1}{24}$ of 1 rotation)
24 hours = 1 day (1 rotation)
91/92 days = 1 season ($\frac{1}{4}$ of 1 revolution)
4 seasons = 1 year (1 revolution)

The antipodes maps of the celestial year-clock clearly shows the longer days and shorter nights of summer, and the shorter days and longer nights of winter for both the northern and southern hemispheres. Even why the region known as "the land of the midnight sun" is termed thus can be easily visualised mentally from studying the series of antipodes maps showing the seasonal migration of the daytime and night-time hemispheres. Note that there is a similar region in the southern hemisphere that experiences the same phenomenon. Note also that during all the seasons there is equal daytime and night-time along the equator. There is equal daytime and night-time for all places on earth only during the equinoxes. Each of the smaller diagrams depicting a one-sided view of half the earth for each of the seasons cannot give as much details as its representative, the antipodes map.

The diagram below shows the different earth-times at selected places on the antipodes map at a moment of time (G.M.T. 12 hours on September 21). The places selected are close to meridians that are 3 hours apart. Since it is the equinox on that day there is equal daytime and night-time for any place on earth. If the International Date Line is crossed from west to east a day is gained, and if it is crossed from east to west a day is lost.



Note that a polar circumference (a meridian and its anti-meridian) separates the daytime and night-time hemispheres. This can happen only during the equinoxes (March 22 and September 21). All the times are the approximate geographic earth-times caused by the earth's rotation, and not the standard times of the places. The Earth's Rotation Simulating Chronographometer (E.R.S.C.) is based on this 24 hour concept, but is adapted to reflect the standard times of the various places.