THE GEOCHRON GLOBAL TIME INDICATOR

AT THE CENTER FOR ENVIRONMENTAL AND SCIENTIFIC EDUCATION

A Meadowlands Environment Center Facility

A BRIEF HISTORY OF TIME

Since the creation of the sundial, our basic time source has always been the rotation of the earth and its relationship to the sun. When clocks were created, towns across the earth observed their own local times based on the instant that sun reached its zenith at their localities, "high noon" being the universal time for setting clocks.

A problem with this method arose when the first transcontinental railroads were built and long-distance transportation became common; time confused travelers so much that in the 1870s the 24 standard world time zones were set up by an international agreement.

The creation of time zones solved this problem, but in our modern age of high speed travel, communications technology, and international involvement, more and more people need to know what time it is in other time zones. Clocks and watches are inadequate measurers of time globally, as they are only meant to indicate local time, and because clocks present time as an abstract number, learning the time in another part of the requires time zone conversions, figuring out whether it is a.m. or p.m., and what day of the week it is. As there are now 40 local time zones (24 Standard and 16 Non-Standard), the conversion is often difficult and time-consuming, and multiple clocks or dials would be impractical.

A solution to this problem is **Geochron**, the global time piece that the Smithsonian has labeled "the last significant contribution in time keeping." It was developed by James Kilburg in 1963; the idea came to him a year earlier when he was visiting relatives overseas and his wife, unaware of his local time, had called him from home at 2 a.m.

Mikhail Gorbachev accepting the Geochron presented by Ronald Reagan as "an example of American ingenuity."

THE GEOCHRON AS AN EDUCATIONAL TOOL

The Meadowlands Environment Center's Geochron is located within the NJMC Center for Environmental and Scientific Education. MEC educators use the clock to illustrate to students and the public the manner in which the hours of daylight (motions of the sun) are reflected around the world.

HOW TO READ WORLD TIME ON GEOCHRON

Geochron is a precision Mercator projection of a world map printed on dimensionally stable light weight plastic, which is a belt that is driven slowly from left to right by an electric clock monitor in synchronism with the rotation of the earth. All of the time zone boundaries are indicated on the map by dark blue lines, which in most cases line up with lettered pointers on the top edge of the map. These letters identify the standard time zones and represent the short-wave radio prefix for that zone.

The time zone arrows point to a stationary time scale across the top of the map that reads from midnight to the left, through noon in the middle, and to midnight again at the right. To read the time in any standard zone in the world, you simply find that place on the map and follow the zone boundaries to the arrow which points out the correct time. Certain nonstandard pocketed zones that don't have boundaries extending to an arrow are marked with a letter and a number. The letter tells you which arrow to read and the number indicates the deviation from the standard time. India, for example, is designated with E+30. Simply add 30 minutes to the time you read on the E pointer.

As the map moves slowly across the frame from left to right, and the International Dateline crosses the frame once each day. The days of the week observed on either side of the Dateline are displayed in windows near the bottom of the map. The date and month for these two days are shown on the indicator mounted at the bottom of the Geochron.

The clock is designed to show the exact portions of the earth in daylight, and those that are in darkness, at the very instant that you are observing Geochron. The brightly illuminated pattern in the center of the map delineates those areas that are in daylight. The left edge of this pattern is the line of sunrise as it travels across the earth and the right edge is the line of sunset. The length of the day changes daily as the earth progresses through its seasons, so the light pattern on Geochron changes also from day to day. Thus, the time of sunrise and sunset and the relative length of day and night can be read for any latitude.

The clock also shows the progress of the seasons during the year. The summer and winter solstices (on the date of the longest and shortest days of the year) and the vernal and autumnal equinoxes (when the day and night are of equal length) are clearly shown by the light pattern. A small black dot indicates the **zenith, or "apparent noon" position of the sun** as it travels the earth, at any time on any date.

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