The gentleman on the Titania

P D Hingley's account (A&G 40 2.7, 1999) of the Robert Stevenson Trust photographs of scenes aboard Stevenson's yacht Titania taken by Charles Piazzi Smith in the course of his site-testing expedition to Tenerife in 1856 is of great interest. Two of these photographs fill the only gaps in the extensive collection of glass-positive photographs of the Tenerife expedition in the Piazzi Smith archive at the Royal Observatory Edinburgh. I would, however, question Mr Hingley's identification of the figure in the published photograph. Mr Hingley suggests that it is Piazzi Smith; I believe that it is the vessel's Captain.

When a catalogue of the photographs in Piazzi Smith's Bequest to the Royal Society of Edinburgh was drawn up in 1988 prior to their transfer to the ROE Collection (M T Brück 1988 Vistas in Astronomy 9 235-239), it appeared that several of the 71 original stereo-photographs (labelled by Piazzi Smith's) had been removed. Fortunately there were duplicates of all but two of these scenes. The labels on these two were recorded by the untraced borrower as “On Board Titania” and “Captain and Crew of Titania”.

The initial date of the year varied from country to country and time to time; the most common dates were 25 December, 1 January, 1 March and 25 March. In the ancient Roman calendar, March was the first month of the year, as is shown by the numbering of the months September to December, and in the position of the intercalary day in leap years at the end of February, then regarded as the last month of the year. In England the use of 1 January was not adopted until 1572. The Gregorian calendar was adopted and 11 days were “lost”. In Scotland, however, the year has begun officially on 1 January since 1600.

There is one further source of doubt about the most appropriate time to celebrate the beginning of the new millennium: namely the variations in the definitions of the beginning of the days that are counted by the calendar. These have included sunrise, noon (meridian-transit of Sun), sunset or midnight.

The astronomical millennium

The controversy over the instant of time that should be regarded as the beginning of the third millennium arises from the attempt by some to perpetuate an early calendrical system in which the numbers assigned to the years are regarded as ordinal rather than cardinal numbers. Such systems were appropriate, and even necessary, before the concept of the number zero. This type of system is still in use for numbering the days of the month, but has been abandoned in everyday life for the smaller units of time, the hour, minute and second. It has also been abandoned for the reckoning of the age of a person: someone aged 40, for example, is actually in their 41st year.

The Gregorian calendar now in widespread international use for most purposes other religious observances was derived from the Julian calendar, established in the Roman Empire by Julius Caesar. A new chronological reckoning of the years for use in the Christian religion was introduced over 500 years later and was adopted at different times in different countries. The first year of the Christian era is denoted by AD 1 and the preceding year is denoted by 1 BC. The abhor who introduced this system intended that the beginning of the first year would correspond to the time of the birth of Jesus Christ, but it is now generally accepted that Christ was born in 6 BC.

The notation AD is not appropriate; the plus symbol could be used for emphasis, but it is not necessary.

The second of these is measured from the supposed birth of Jesus Christ, but it is not, and correspondingly the “fraction of the year” is measured from Jan 1.0 (where, for convenience, the time of day is measured in fractions of a day rather than in hours, minutes and seconds). I am embarrassed to see that this long-standing convention has not been followed in The Astronomical Almanac I can only assume that the change escaped my notice when the Astronomical Ephemeris and the American Ephemeris were eventually completely unified in 1981 with the new title.

Astronomers also use other systems for denoting instants of time. In particular, the system of Julian Date (denoted JD) is a continuous measure of days and fractions of a day. When this system was first introduced, astronomers used to regard the day as starting at noon, and so we find that the date 2000 January 1.0 is JD 2451544.5. For the precise identification of an instant of time it is necessary to specify the timescale being used as well as the numerical value.

Certain instants of time of particular importance in connection with the precise specification of the positions of the astronomical objects, such as stars and planets, are known as standard epochs; these are now usually separated by intervals of 50 Julian years, where a Julian year is 365.25 days in length. (Until quite recently, standard epochs were defined in terms of the Besselian year, but this is of variable length and so is less convenient for some purposes.) The Julian epoch nearest to the beginning of the next millennium is denoted by J2000.0 and is the instant JD 2451545.0 or 2000 January 1.5. Perhaps astronomers should also celebrate this instant.

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