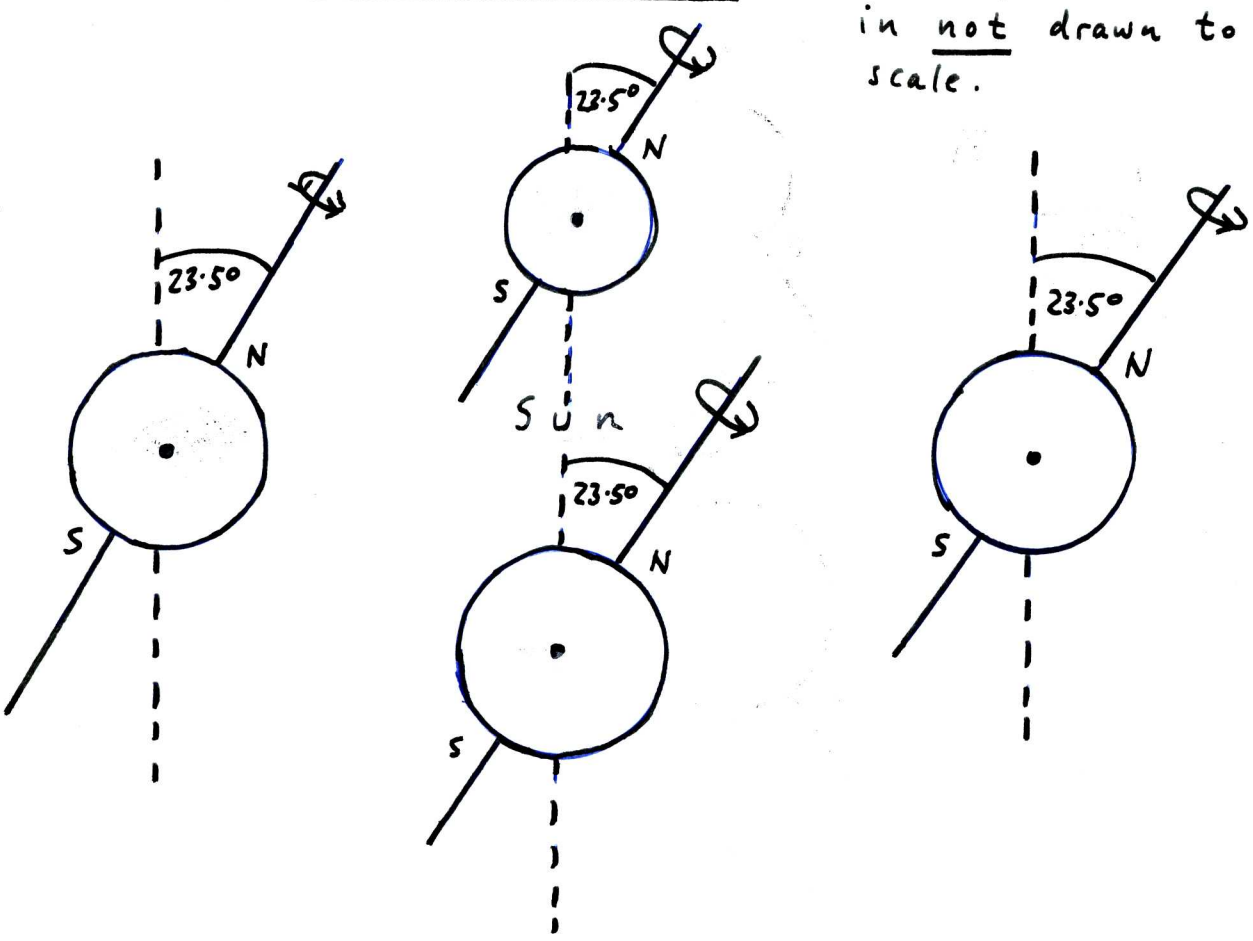
The terrestrial seasons

DF

Clearly, the diagram in not drawn to scale.



The seasons occur because the axis of the Earth is tipped with respect to the plane of orbit in which it revolves around the Sun.

In the above, the broken line is drawn perpendicular to the plane of the orbit of the Earth. When the northern hemisphere is tilted towards the Sun, it has its summer; at the same time the southern hemisphere is having its winter.

At both locations of the Earth shown, the Earth rotates through many 24-hour day-night cycles before its motion around the Sun moves it appreciably.

Many people misunderstand the cause of the seasons. Note that the mechanism has nothing to do with the (minor) variations in the Sun-Earth distance. Indeed, the Earth is closest to the Sun (perihelion: $1{\cdot}47\times10^{11}$ m) around January 4, which falls in the northern-hemisphere winter. Aphelion ($= 1{\cdot}52\times10^{11}$ m) occurs on July 4, which is in the northern-hemisphere summer.

D.F.

1999, March 13