

## An Insight Into the Science Behind “Flat Earth” Societies

Is the earth flat like a pancake or spherical like a globe?

From ancient times each concept has had its supporters. The Sumerians, Babylonians, ancient Egyptians, early Hebrews, and most Greeks believed in a flat earth. Some ancient Greek scientists, as well as many Church Fathers—for example, Origen, the Venerable Bede, Albertus Magus, and St. Thomas-Aquinas—supported the round earth. In late medieval and early modern times, Roger Bacon, Copernicus, Galileo, Columbus, and Magellan held that the earth is round.

The modern flat-earth movement was founded in England about 1850 by Samuel Birley Rowbotham. William Carpenter and Charles Johnson continued the movement. Johnson directs the International Flat Earth Research Society in Lancaster, California. The Society has a small number of true believers from many parts of the world. Another flat-earth group is the Christian Catholic Apostolic Church in Zion, Illinois, headed for many years by John Alexander Dowie and William Glenn Voliva. A flat earth is a basic doctrine of this church.

Both concepts—the flat earth and the round earth—at first glance are equally reasonable. *A priori* there is no basis for preferring one to the other. For example, both concepts allow eclipses to be predicted accurately. Prediction is possible, however, because eclipses occur at regular intervals. Accurate record-keeping makes it possible to determine these intervals. Only when we examine all the relevant evidence do we have a basis for making a reasoned choice.

The flat earth concept asserts that the earth is like a phonograph record. The North Pole is at the center. Around the rim is a 150-foot-high wall of ice which nobody has ever crossed. This ice wall is "south." There is no South Pole. The equator is a circle half way between the North Pole and the South Ice Wall. See Fig. 1. Following is some of the evidence said to support this view:

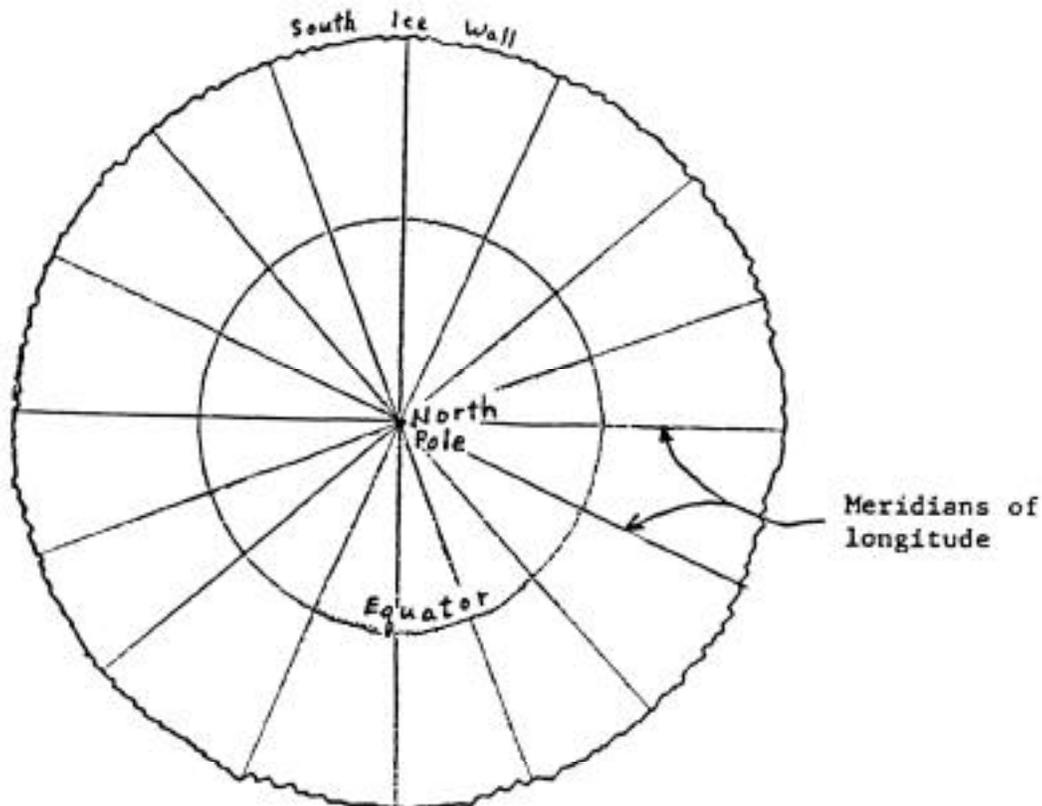


Fig. 1 The Flat Earth Concept

## **A. Some evidence for the flat earth concept:**

1. Many passages in the Bible are consistent with a flat earth.
2. The land looks flat, even when viewed from high up or when measured by surveyors' instruments.
3. The surface of every body of water is flat. (See experiment conducted by Alfred Russel Wallace and John Hampden to test this hypothesis described in Schadewald's publications.)
4. In nature there is an "up" and a "down." If the earth were round, people in Australia would hang by their heels.
5. There is no gravitation.
6. The circumference of the earth at 45° south latitude is double what it is at 45° north latitude, because in the south the meridians of longitude spread out as they approach the South Ice Wall.
7. The space program is a fraud. The space shuttle is a joke. The Apollo moon project was a Hollywood scenario written and directed by Arthur C. Clarke, well-known science fiction writer.
8. In certain eclipses of the moon, both the moon and the sun are seen above the horizon. Thus the earth cannot be a round body positioned between the sun and the moon.
9. Also see William Carpenter, "One Hundred Proofs that the Earth Is Not a Globe".

## **B. Some evidence for the round earth concept:**

1. On a flat earth, bodies in the sky should be visible at the same time from all parts of the surface. This is not so. For example, stars around the Pole Star are never visible at low latitudes in the southern hemisphere.
2. If the sun is observed at noon from different points on the same meridian of longitude, it is seen at different angles from the different points. This would not be true on a flat earth. In the year 240 B.C., Eratosthenes measured the difference between two such points. From this difference, and from the distance between the points, Eratosthenes calculated the circumference of the earth as 24 000 miles close to the currently accepted value (see Fig. 2).
3. The South Pole has been located exactly by explorers and by Antarctic expeditions. On a given day at this point, the sun is lower in the sky than anywhere else on earth, because the South Pole is the southernmost point. No insurmountable ice wall has been found in Antarctica.
4. The times at which sunrise, sunset, the rising and setting of stars, and eclipses are seen to occur differ at different longitudes. This would be true on a round earth but not on a flat earth.
5. In a total eclipse of the moon the sun is always below the horizon. The eclipse is caused by the shadow of the round earth completely covering the moon. In a partial eclipse the sun may be partially visible. In this event the earth's shadow on the moon is seen to have a curved edge.

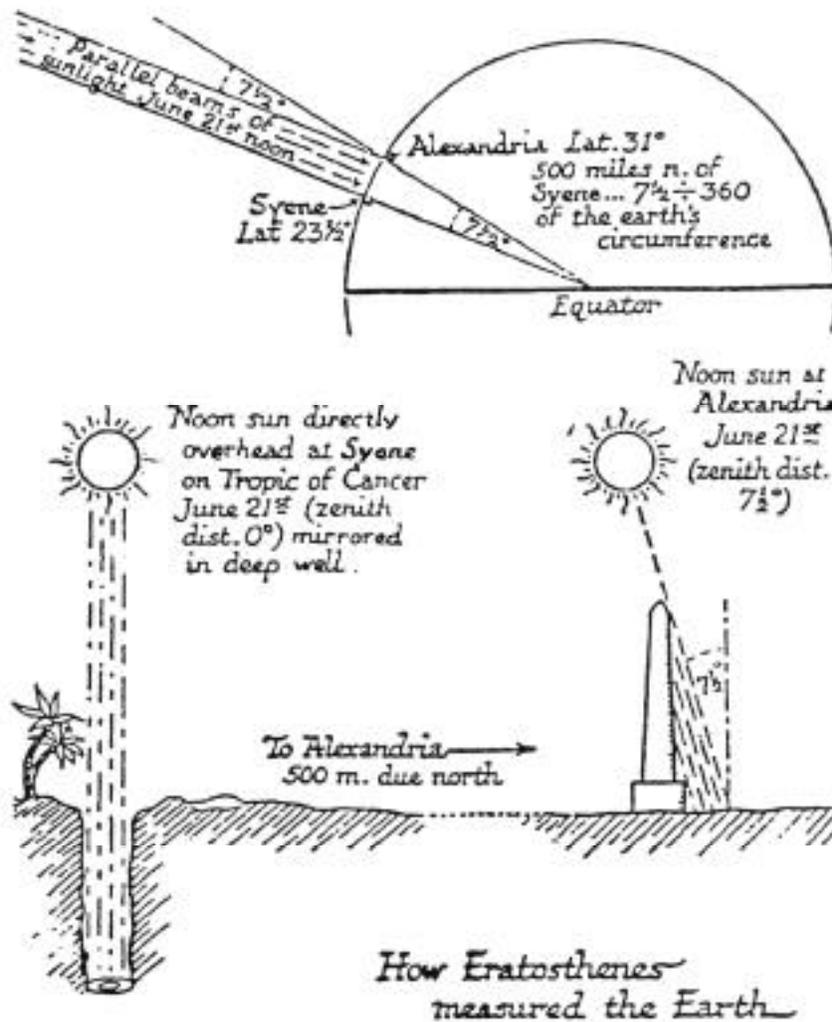


Fig. 2 Note that at noon the sun lies directly over the observer's meridian of longitude. Syene and Alexandria have nearly the same longitude. So the sun, the two places, and the earth's centre may be drawn on the same flat slab of space.

6. As a ship moves away from an observer, it disappears below the horizon hull first (see Fig. 3)

7. The distances between meridians of longitude become smaller as we move north in the northern hemisphere and south in the southern hemisphere. This would be true on a round earth. On a flat earth it would be true as the meridians converge toward the North Pole. But in the southern region of a flat earth, the meridians would spread out as they approach the South Ice Wall, and the distances between them would become greater.

8. It is correct that surveys of short distances and small areas — city lots, for example — are done accurately on the assumption that the earth is a flat plane. This works out because the error caused by ignoring the curvature of the earth is less than the error of the surveyor's instruments. But in larger-scale surveys, such as laying out the long boundary between the United States and Canada, plane surveying becomes inaccurate. Instead, geodesy, based on the assumption of a round earth, is used. Geodesy uses sights on bodies in the sky to locate points on the earth. Also, all accurate plane surveys use a network of geodetic "monuments" as starting points.

9. The earth does not have a top or bottom. "Up" and "down" are based on gravity. "Down" is toward the earth. On the moon, "down" is toward the moon. There is a point between the earth and the moon where the gravitational pulls of the earth and the moon are equal. Here there is no gravity and no up or down. At this point astronauts experience weightlessness. In the universe outside the solar system there is no center of gravity; hence there is no "up" or "down."

10. The equator and parallels of latitude run straight on the earth's surface. They are not curves on a plane surface as called for by the flat-earth concept. Instead, they curve in the third dimension of a round earth.

11. No map simultaneously and correctly shows distances, dimensions, and shapes and sizes of land masses. This is because there must be some distortion when the round earth is projected onto the flat surface of the map. Depending on the type of projection chosen, a choice is made as to the dimensions to be shown correctly and the dimensions to be distorted.

12. The curvature of the earth's surface is clearly shown in photographs made from space.

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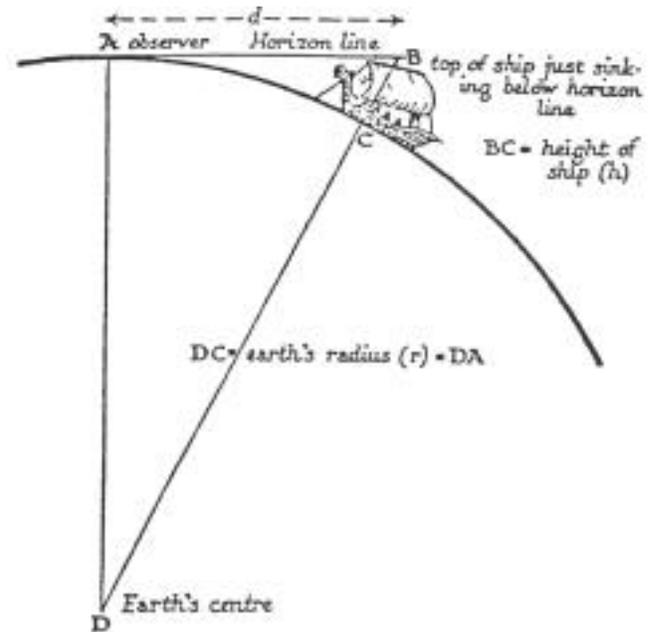


Fig. 3 The tangent of the horizon line