



Flat Earth Dave



Mark Sargent



Eric Dubay

## The Flat Earth Phenomenon

<u>Acts 17:11</u> ... be a good Berean ... <u>1 Th. 5:21</u> ... but test all things ...

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## The Flat Earth Phenomenon

1) The Flat Earth Concept

2) Spherical Earth History

3) Flat Earth History

4) What Do Flat Earthers Say?

5) What Does the Bible Teach?

6) 12 Evidences For a Spherical Earth

7) 12 Challenges To The Flat Earth Concept

8) 12 Flat Earth Assumptions

9) Conclusions

10) The Final Experiment









#### Earthly Model according the Bible

The Earth is flat (Isaiah 24:1 ; Matthew 4:8). The Earth doesn't move (1 Chronicles 16:30). The Earth rests on pillars (Samuel 2:28). The Sun goes round the Earth (Joshua 10:13). The Stars are lights set in a dome over the Earth (Genesis 1:16-17).

#### **1. The Flat Earth Concept**

An Earthly Model "According to the Bible"



"And God made the firmament, and divided the waters which were under the firmament, from the waters which were above the firmament: and it was so." - Genesis 1:7

"Hast thou with him spread out the sky, which is strong, and as a molten looking glass?" - Job 37:18

"And the stars of heaven fell unto the earth, even as a fig tree casteth her untimely figs, when she is shaken of a mighty wind." - Revelation 6:13

"He set the earth on its foundations, so that it should never be moved." - Psalms 104:5

Flat Earth: The Firmament "According to the Bible"



#### Firmament Dome Over Flat Earth





#### The Dome Over Flat Earth





#### Flat Earth Firmament [AIG]



Answers in Genesis Illustration of the Flat Earth Concept







Flat Earth Movement of Sun and Moon



#### Flat Earth Map Dome Display Model





Flat Earth Map: Gleason's New Standard Map of The World – 1892



## Flat Earth Concept

- Earth is a round stationary disk, ~25,000 miles in diameter
- Dome is ~3,000 miles above the earth
- Sun and moon are each ~32 miles in diameter
- Sun and moon orbit around northern axis above the earth under the dome
- Stars and 5 visible planets are in the dome – Jupiter, Venus, Mars, Mercury, Saturn – in the order of diminishing brightness
- Antarctic wall around earth's disk circumference at the base of the dome





Map of the earth with North Pole at the center, no South Pole, Gleason Standard Map







#### Pythagoras of Samos, 570 – 495 BC

- 8 concentric spheres surrounding the earth, stars in outer sphere; sun, moon, 5 planets in other spheres
- First mention of the **sphericity of the earth**
- Hulls of ships disappear over the horizon Heraclides Ponticus, 387 312 BC
- Proposed **earth rotates on its axis** Aristarchus of Samos, 310 – 230 BC
  - Greek astronomer and mathematician
  - First known **heliocentric model** with sun at the center, earth revolving around the sun once per year and rotating about its axis once a day
  - Arranged the other planets in the order of distance around the sun









# Trigonometric Parallax in Astronomy

- Used to measure distance to the moon
  - Observe from A and B
  - Distance to Moon is D
  - Angle is theta, D = d/theta
  - Estimated by Ptolemy in ~160 AD
- Used to measure distance to a star
  - Observe from earth at two different times 6 months apart
  - Distance to star = D
  - Angles are theta/2
  - Estimated by Aristarchus ~300 BC









- Eratosthenes of Cyrene, 276 194 BC
  - Greek astronomer and mathematician
  - First person to calculate the circumference of the earth
  - First person to calculate earth's axial tilt
  - Created first global projection of the world
- Hipparchus, 190 130 BC
  - Greek astronomer and mathematician
  - Founder of trigonometry
  - Discovered the precession of the equinoxes
  - Developed method to predict solar eclipses







Geometric construction used by Hipparchus in his determination of the distances to the Sun and Moon, using the **parallax method** 

### Eratosthenes, Greek Philosopher, 200 BC



Syene lies near the Tropic of Cancer, nearly 490 miles due south of Alexandria in Egypt. This distance represents 7.2° of arc, or about 1/50 of Earth's circumference. This was measured on the day of summer solstice with the sun at its ...

> Shadow of Obelisk at Alexandria

Well of Svene (Aswan)

ALC: NO DESCRIPTION

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The sun's rays are virtually parallel.

24: 500 miles

Eratosthenes Calculated Earth's Circumference

Sunbeams are shown as two rays hitting the ground at Syene and Alexandria. The angle between the sunbeam and a vertical pole at Alexandria allowed Eratosthenes to estimate Earth's circumference.

... zenith, the only time when sunlight reaches the bottom of the well. Eratosthenes (276-194 BC) determined the distance around the equator to be about 24,500 miles, within 2% of the actual figure of 24,901 miles!



- Claudius Ptolemy, 100 170 AD
  - Alexandrian astronomer and mathematician
  - Geocentric model of the Solar System
  - Author of a dozen scientific treatises
  - Treatise in astronomy Almagest
  - Catholic church promoted his work
- **Classical planets** 
  - Sun, Moon, Jupiter, Venus, Mars, Mercury, Saturn
    - brightest to dimmest
  - Planets visible to the naked eye
  - Movement observed across the sky







- Nicolaus Copernicus 1473-1543 AD
  - Prussian astronomer and mathematician
  - Proposed heliocentric model
  - Developed model independent of Aristarchus of Samos
  - All orbits are circular
  - Sun at the center, not the earth
  - Stars do not move with respect to each other
  - Wrote the book On The Revolutions of the Celestial Spheres
- Formulated economic principles, etc.







- Galileo Galilei 1564 1642 AD
  - Italian astronomer and physicist
  - Telescope invented in 1608
  - Built an improved telescope to observe stars, Jupiter rings, lunar craters, sunspots
  - Championed Copernican heliocentrism
- Johannes Kepler, 1571 1630 AD
  - German astronomer and mathematician
  - Developed 3 laws of planetary motion
  - Discovered all planets move in ellipses







## 3. Flat Earth History

- Flat Earth believed by some ancient cultures, but not taught by early Church Fathers
- Samuel Rowbotham convinced of flat earth in 1838 AD based on the "Bedford Level Experiment"
  - Published a pamphlet on:
    "Zetetic Astronomy: Earth not a Globe"
  - Wrote book with this name in 1865
- Others joined the FE movement in the late 1800's
- Some more books published in the mid 1900's
  - Interest in FE concept dropped off
- Eric Dubay, FE guru, author of two books in 2010's:
  - 200 Proofs the Earth is Not a Spinning Ball (2015)
  - Flat Earth Conspiracy (2014)
- Interest in Flat Earth increased via YouTube videos
  - Taught by non-believers and believers alike





# Bedford Level Experiment

- Experiment run by Samuel Rowbotham in the UK in 1838
- Objective to deny curvature of the earth
- Used a telescope held 8 inches above the water to watch a boat with flag on its mast 3 feet above the water
  - Observations made along a 6-mile length of old Bedford river
- In 1870, allowing for the effects of atmospheric refraction, Alfred Wallace found curvature consistent with a spherical earth



Search for "Bedford Level Experiment" on website Wikipedia.org



## **Atmospheric Refraction**

- Atmospheric refraction is the deviation of light or other electromagnetic wave from a straight line as it passes through the atmosphere due to the variation in air density as a function of height
- This refraction is due to the velocity of light through air decreasing (the refractive index increases) with increased density
- Density of air decreases with height above the earth's surface
- Light rays traveling nearly horizontally bend downward
- For measurements close to the surface, the downward curve may match the mean curvature of the earth's surface



Diagram showing displacement of the Sun's image at sunrise and sunset



In 1870, **Alfred Russel Wallace** took a challange from a flat-Earther & successfully confirmed the existence of **Earth's curvature** in the **Bedford-Level experiment**.



Wallace did the experiment on the **Bedford Canal**. He fixed a **black band** on the **Old Bedford Bridge** & observed it with a **telescope** from the **Welney bridge** 6 miles away. Right in the middle, he placed up a **pole** with two **discs** on it. The **telescope**, the **top disc**, & the **black band** are at the **same height above the water**.



#### **FlatEarth.ws/bedford-level** Debunking Flat Earth Misconceptions

### Subsequent Bedford Level Experiments

- 1870 by Alfred Wallace, a Land Surveyor
  - Observed with telescope 13' up to avoid atmospheric refraction
  - Used 3 equal height poles
  - Showed earth curvature
- 1901 by Henry Oldham, a geography teacher
  - Showed earth curvature
- Taught in public schools until satellites available
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## Major FE Proponents Today

- Daniel Shenton resuscitated defunct FE Society in 2004
  - Believes in Evolution and Global Warming
  - Believes earth is a disc that you can fall off of
- <u>Eric Dubay</u> produced many FE videos starting in 2010
  - Non-believer, New Age neo-Nazi
- <u>Mark Sargent</u> YouTube videos on FE Clues
- <u>"Flat Earth" Dave</u>
- Rob Skiba major YouTube producer
  - "Christian" heretic
- Philip Stallings, founder of Biblical FE Society
- Dr. Michael Heiser, a compromising theologian?
  - NO, he was quoted wrongly that "he believed the OT taught FE"
- Pastor Dean Odle in Alabama













#### What Do Flat Earthers Say?

- Gravity makes no sense buoyancy and density
- Water doesn't curve, and water finds its own level electromagnetic force
- How can water stick to a ball spinning at 1000 miles per hour gravity
- Water cannot flow up north/up
- Perplexed about how the earth's atmosphere exists next to the vacuum of space
- Shouldn't see this thing, but I do earth must be flat
- Earth closer to the sun in summer than in winter
- Science is a religion scientism
- We have all been indoctrinated by government, teachers, etc.



200 Proofs Earth is

Not a Spinning Ball

**By Eric Dubay** 

## 200 Proofs Earth Is Not A Spinning Ball Book by Eric Dubay

- Eric Dubay
  - Not a Christian
  - American Yoga instructor living in Thailand
  - Came across century-old writings by Rowbotham
  - Rekindled the Flat Earth movement
- 200 Proofs
  - Eric Dubay's book published in 2015
  - Twice as many proofs as John Carpenter's book of 19<sup>th</sup> century – 100 Proofs Earth Is Not A Globe





#### FLAT EARTH CLUES End of The World Mark Sargent

#### 14 "Flat Earth Clues" by Mark Sargent

The Flat Earth Clues book gives you 14 compelling reasons why you should rethink the globe model that you have been taught. Before you were born, before your parents, your grandparents, before you even had a family line... there was the illusion, the trick, the lie... That you lived on a small spinning rock, flying through space. What if, after centuries of preaching the globe as a religious icon, "the powers that be" found out that it was actually not a sphere, but instead something much different? Would they risk unraveling 500 years of science doctrine by informing the public?

FLAT EARTH CLUES The Sky's the Limit



MARK SARGENT



### 4. What Does the Bible Teach?

- "200+ Flat Earth (FE) Bible Verses"?
- Many of these verses are dealing with other issues different from whether the earth is flat or spherical, e.g. geocentric, heliocentric
- Different genre history, poetic, allegorical
- Meaning depends on context, grammatical or literary
- Many alleged FE verses from poetic books
- Some alleged FE verses talk about the land, not the planet
- Use of equivocal or idiomatic language
- Cherry-picked verses not found in all translations
- "Flat Earth" never taught throughout church history



## Alleged FE Verses Grouped into 3 Classes

- <u>Class 1</u>: verses that have nothing to do with the flatearth argument. In classical terms, these are called non sequiturs, or "does not follow"
- Class 2: verses that are ambiguous in relation to the shape of the earth, i.e. using equivocal language. A proper analysis would require a decent knowledge of ancient languages and the context, or at least a careful reading of scholarly sources that discuss the passage in question
- <u>Class 3</u>: verses that involve a misreading of non-modern English terminology in some older versions, often cherry-picked. In classical terms, this is called lying



### Class 1: Non-Sequiturs

- Earth created before the sun, **Gen. 1:1-19**
- Universe is complete, NOT ever expanding, Gen. 2:1
- Earth is fixed and immovable, **Ps. 33:9**, **Is. 45:18**
- Be still and know that I am God, Ps. 46:10
- Sun moves, not the earth: Gen. 15:12, Ex. 22:26
- Sun STOPS moving, Is. 60:20, Job 9:7
- Moon has its own light: Gen. 1:16, Ezek. 32:7
- New Jerusalem, the HUGE cube, **Rev. 21:15-17**
- etc.



## Class 2: Equivocal or Decontextualized

- Earth is a disk/circle, not a ball: Is. 40:22, Job 38:13-14
- Earth measured with a line, not a curve: **Job 38:4-5**
- Paths are straight, not curved: Sam. 6:12, Ps. 5:8
- Earth has **pillars**, and hangs on nothing: **Job 26:7**
- Waters have a **face** (geometrical flat surface): **Gen. 1:2**
- Earth has ends: Deut. 28:49, Dan. 4:22
- Earth has corners: Is. 11:12, Rev. 7:1
- Firmament/Dome: Gen. 1:6-8, Ps. 19:1
- etc.

# Class 3: Relying on Archaic English Translations

- Waters are straight, not curved: **Job 37:10**
- Voice of creation goes out in a "line" through all the earth: **Ps. 19:4**
- Matthews Bible from 1537 says "flat earth": 2 Sam. 11:11
  - ESV: "in the open field"
  - KJV: "in the open fields"
  - NIV: "in the open country"



#### "Four Corners of The Earth"

- Isa. 11:12 ESV, He will raise a signal for the nations and will assemble the banished of Israel, and gather the dispersed of Judah from the four corners of the earth.
- **Rev 7:1 ESV**, After this I saw four angels standing at the **four corners of the earth**, holding back the four winds of the earth, that no wind might blow on earth or sea or against any tree.
- **Rev 20:7-8 ESV**, And when the thousand years are ended, Satan will be released from his prison, and will come out to deceive the nations that are at the **four corners of the earth**, Gog and Magog, to gather them for battle; their number is like the sand of the sea.
  - an idiomatic expression
  - earth is round in FE model

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### "Ends of the Earth"

- Appears 28 times in the Bible
- Ps. 67:7, "May God bless us still, so that all the ends of the earth will fear him."
- **Ps. 98:3**, "He hath remembered his lovingkindness and his faithfulness toward the house of Israel: All **the ends of the earth** have seen the salvation of our God."
- Is. 45:22, "Turn to Me and be saved, all the ends of the earth; For I am God, and there is no other."

- does not refer to geography, but to people all over the earth


### Earth's Pillars

- Job 9:6, "He shakes the earth out of its place, And its pillars tremble;"
- **Ps. 75:3**, "When the earth totters, and all its inhabitants, it is I who keep steady its **pillars**. Selah"
- Ps. 93:1, "The Lord reigns, He is clothed with majesty; The Lord has clothed and girded Himself with strength; Indeed, the world is firmly established, it will not be moved."
  - many of these verses found in poetic books
  - they use imagery and non-literal language



### Firmament/Dome

- Hebrew word "raqia"
  - Interpreted as "dome over the earth" in Flat Earth, i.e. dome is the firmament in Gen. 1:6-8
  - Based on the verb "raqa", "to spread out"
  - Translated as "the expanse" in most modern English translations
- Gen. 1:14-19 places the sun, moon, stars in "raqia"
- Gen. 1:20 describes the birds flying across the face of the raqia
- *raqia* called "space and the earth's atmosphere" [sky]

https://answersingenesis.org/astronomy/earth/falling-flat-earth



# What the Bible Says About The Earth As A Sphere (100 verses)

**Is. 40:22**, It is he who sits above the **circle** of the earth, and its inhabitants are like grasshoppers; who **stretches out the heavens** like a curtain, and spreads them like a tent to dwell in.



- Job 26:7, He stretches out the north over the void and hangs the earth on nothing.
- **Job 26:10**, He has inscribed a **circle** on the **face** of the waters at the boundary between light and darkness.
- **Prov. 8:27**, When he established the heavens, I was there; when he drew a **circle** on the **face** of the deep.
- 100 verses found here -

https://www.openbible.info/topics/the\_earth\_is\_a\_sphere



# 5. Evidence for a Spherical Earth

- 1) Ship's hull disappears over the horizon (sail appears first)
- 2) Earth's shadow is circular on the moon during lunar eclipses
- 3) The sun, moon, and planets appear to be spherical
- 4) Classical planets moving across the sky
- 5) Different time zones in different longitudes
- 6) Curvature of the earth seen from heights above 50K+ feet
- 7) Pictures of earth from the moon and from ISS
- 8) Pictures from Hubble Space Telescope and from James Webb Space Telescope (JWST)
- 9) Foucault Pendulum caused by earth rotation
- 10) Coriolis Effect caused by earth rotation
- 11) Traveling northward, stars above the southern horizon disappear below the horizon; Northstar in the northern hemisphere; Southern Cross in southern hemisphere
- 12) Stars appear to spin counterclockwise around north celestial pole every 24 hours  $^{40}$



# i) Disappearing Over The Horizon

Ship's hull disappears over the horizon

Distance to the horizon from different heights, using Pythagoras theorem

- R<sup>2</sup> + d<sup>2</sup> = (R+h)<sup>2</sup> [R = 4,000 miles]
- For small h,  $h = d^2 / 2R$
- For d = 1 mile, h = 8 inches
- For d = 6 miles, h = 24 feet
- For d = 30 miles, h = 594 feet
- Refraction allows one to see further
  - Bending light around the curve
  - Temperature and pressure differences







### Looking at Drilling Platforms From Shore

**BUB BYE BALL !!!** 

# Platform Habitat 9.41 Miles

### Platform Hillhouse 6.21 Miles

# Strong Refraction Simulation & Reality of 2 Oil Platforms



#### Refraction



**CN Tower height:** 553 m / 1815 ft

From Olcott NY, to Toronto - 39 miles

Approx 184 m / 603 ft below sea level



The strength of **atmospheric refraction** is **not constant**. It depends on **weather condition** & **varies** on the different seasons, different days & even different times of the day.



Due to the **variability of atmospheric refraction**, a distant object that is usually obstructed by **Earth's curvature** can **sometimes be visible**. Some Flat-Earthers would **cherrypick** moments when the object is visible & happily **ignore** when it is not, then use it to "disprove" **Earth's curvature**.





#### Visibility of Distant Objects on Earth's Surface

Graphs of distances to the true horizon on Earth for a given height h. s is along the surface of Earth, d is the straight line distance, and ~d is the approximate straight line distance assuming h << the radius of Earth, 6371 km.

The roughly spherical shape of Earth can be empirically evidenced by many different types of observation, ranging from ground level, flight, or orbit. The spherical shape causes a number of effects and phenomena that combined disprove Flat Earth beliefs. These include the visibility of distant objects on Earth's surface; lunar eclipses; appearance of the Moon

https://en.wikipedia.org/wiki/Empirical\_evidence\_for\_the\_spherical\_shape\_of\_Earth

# ii) Explaining Lunar Eclipses



- Recognized by Greek Aristotle in 4<sup>th</sup> century BC
- Seen with both the moon and the sun in the sky and the earth in between
  - Time lapse photos of the moon
- Eclipses determined via Saros cycle over the years



A sequential view of a lunar eclipse shows Earth's shadow crossing the face of the Moon. The shadow's shape is curved because Earth is spherical. Source: NASA/Bill Ingalls.





#### Time-Lapse Photos - Lunar Eclipse





Time-lapse photos of the moon during a lunar eclipse, showing the circular shadow produced by the spherical earth



#### Lunar Eclipse – Full & Partial





Half of moon always lit by the sun. Phases of moon by changing lit half. Eclipses occur only when moon full. Caused by earth shadow on moon. Depend on moon's orbital plane and its tilt to the [earth's] ecliptic plane.







### iii) Sun, Moon, Planets Appear To Be Spherical





## iv) Classical Planets Moving Across The Sky

- Visible to the naked eye
- Move across the sky
- Backdrop of fixed stars
- Planet referred to as wanderer by Greeks
- Called "Classical Planets" before the time of the telescope
- Telescope discovered other celestial objects after 1608 AD





### v) Discovering Need For Time Zones

- For observing the sun's meridian passing at noon before clocks were invented
- Travelers going west noticed that sun rises
  and sets at different times
- Early devices were sundials and water clocks
  - Commerce and trade required the use of time zones
- Not introduced until 18<sup>th</sup> century

"That the earth, too, is round is shown thus. The signs and stars do not rise and set the same for all men everywhere but rise and set sooner for those in the east than for those in the west; and of this there is no other cause than the bulge of the earth." \* John Sacrobosco in 13<sup>th</sup> century 53



# vi) Image From High-altitude Weather Balloon



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#### vii) Earth and Moon From Apollo 11





#### International Space Station (ISS)



#### **ISS Facts**

17,500 mph 250 miles up 25 years in space 7 to 14 research staff Space shuttle service



### Snapshot of Earth From **ISS**



The curvature of the earth is visible in this 2014 photo which ESA astronaut Samantha Cristoforetti snapped from the **International Space Station** (ISS) 250 miles above the earth





#### Astronaut Outside Of ISS



#### viii) Hubble Space Telescope

Geocentric orbit Low earth orbit 335 miles above Period of 95 min. 30+ yrs in space



Picture of Earth and Moon From the James Webb Space Station at ~1 Million Miles

#### Webb's Orbit Sur, orbiting around a point called 12, always in a straight line with Earth and the Sur. Webb orbits 12 once every 168 days. Moon's orbit Sur



#### ix) Foucault Pendulum



### Foucault Pendulum tracking





Foucault Pendulum Conceptual Diagram



### x) Coriolis Effect

- In physics, the **Coriolis force** is an inertial or fictitious force that acts on objects in motion within a frame of reference that rotates with respect to an inertial frame.
- In a reference frame with clockwise rotation, the force acts to the left of the motion of the object. In one with anticlockwise (or counterclockwise) rotation, the force acts to the right.
- Deflection of an object due to the Coriolis force is called the **Coriolis effect**.

Water in a pan, sink, or toilet rotates counter clockwise in the northern hemisphere and clockwise in the southern hemisphere. This is due to the **Coriolis Effect**, which is caused by the rotation of the Earth.











Objects moving in air and/or wateron the Earth's surface are decoupled from the solid earth, and move independently. Coriolis deflection is an apparent movement (to an observer), due to the fact that the Earth's speed of rotation is slower at the poles than at the equator. Coriolis deflection also affects air and water masses and governs atmospheric and ocean-surface circulation patterns.



#### The Coriolis Effect

 Moving objects curve (don't move in a straight path) because of Earth's rotation (turning)





Objects moving in air and/or wateron the Earth's surface are decoupled from the solid earth, and move independently. Coriolis deflection is an apparent movement (to an observer), due to the fact that the Earth's speed of rotation is slower at the poles than at the equator. Coriolis deflection also affects air and water masses and governs atmospheric and ocean-surface circulation patterns.



21. Object moving north in northern hemisphere is moving faster than the ground underneath, and so is apparently deflected to the ciphe.

Further Explanation of The Coriolis Effect

#### Understanding the Coriolis Effect



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The Coriolis Effect

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Further Understanding Of The Coriolis Effect

# xi) North Star (Polaris) in Northern Hemisphere



- Polaris makes a circle in the sky around the celestial pole with a <sup>3</sup>/<sub>4</sub> degree radius
- Polaris completes one circuit per sidereal day
- A video of Polaris moving can be seen here: https://assets.answersingenesis.org/vid/blog/danny-faulk ner/2022/polaris-timelapse-april14-15-2022-1080.mp4



#### Polaris Moving in the Sky

#### The celestial poles



The North celestial pole is the point in the sky above Earth's north pole. There happens to be a bright star near it, which is called Polaris, or the North Star. Similarly, there's a South celestial pole, but it's not near a bright star.

Celestial Poles Celestial Equator Celestial Sphere Polaris Southern Cross

If you are at the north pole, the north celestial pole is directly overhead. At the equator, the north & south celestial poles appear on the horizon.



### xii) Stars Revolve Around Celestial Poles in Opposite Directions

See the <u>stars in the northern hemisphere</u> revolving <u>anticlockwise</u> (counterclockwise) around Polaris (or more precisely, the Celestial North Pole) Star Trails Around Polaris!

1. https://youtu.be/XTTDWhky9HY

In the <u>southern hemisphere stars</u> appear to revolve <u>clockwise</u> around the Celestial South Pole. See the time lapse videos here (#1: northern hemisphere; #2: southern hemisphere) The Moving Stars of the Southern Hemisphere.

2. https://youtu.be/huysYcz-AiQ

#### STAR TRAILS AROUND POLARIS

THIS SERIES OF 106 IMAGES WAS TAKEN ON 8/31/08 AT CHERRY SPRINGS, PA. EACH FRAME IS A 30-SECOND EXPOSURE AT 18MM, F/3.5 AND AN ISO OF 1600. SHOTS WERE TAKEN IN TWO-MINUTE INTERVALS, RESULTING IN THE FOLLOWING ANIMATION WHICH CONDENSES ALMOST FOUR HOURS INTO A FEW SECONDS. CAMERA USED WAS A CANON DIGITAL REBEL ON A TRIPOD.

©2008 BY JAMES CASTELLI.
# The Moving Stars of the Southern Hemisphere



# Challenges for Flat Earth Model

- 1) Laws of Nature, Physics, astronomy
- 2) What causes tides?
- 3) Flights east vs. flights west
- 4) Stars, planets, rare 6 planet alignment
- 5) Size of sun, moon, stars
- 6) Spotlight sun issues
- 7) Spotlight sun can't explain solstices
- 8) Prediction of lunar and solar eclipses
- 9) Communication and navigation satellites
- 10) Land Surveying corrections
- 11) Projectile flight dynamic model
- 12) Antarctic can't be an ice wall



# i) Laws of Nature, Physics, Astronomy

- Newton's law of gravity
- Newton's 3 laws of motion
- Kepler's 3 laws of planetary motion
- Snell's law of Refraction
- Archimedes principle
  - Density and buoyant force

#### Archimedes Principle





Material	Index of Refraction (n) 1.000		
Vacuum			
Air	1.000277		
Water	1.333333		
Ice	1.31		
Glass	About 1.5		
Diamond	2.417		



#### **Refraction & Snell's Law**



### Laws of Physics

- Newton's Laws
  - 1<sup>st</sup> law of motion: object in motion stays in motion unless acted on by a force
  - 2<sup>nd</sup> law of motion: **F=ma**
  - 3<sup>rd</sup> law: every action has a reaction
  - Gravity: **F = G \* M1 \* M2 / R\*\*2** 
    - Not a result of buoyant forces (FE idea)

Kepler's laws of planetary motion

- 1<sup>st</sup> law: planet orbits around the sun in an ellipse
- 2<sup>nd</sup> law: law of equal areas
- 3<sup>rd</sup> law: relation between orbital period of planet and planet's distance from the sun





- t. law of orbits, states that planets orbit the sun elliptically.
- 2. law of areas, states that a line connecting a planet to the sun covers an equal area over equal periods of time.
- law of periods, allows us to establish a clear relationship between a planet's orbital period and its distance from the sun.



### ii) Ocean Tides

- Tides are caused by gravity
- Differential force of gravity from the sun or moon causes bulges
- Lunar tide is twice as high as the solar tide
- Lunar and solar tides occur at different frequencies
- Tides cannot be explained by the Flat Earth concept [Dubay 117, 118]
- You weigh more at the North Pole than at the equator [Gravity: F = G \* M1 \* M2 / R\*\*2]
- Tidal lock shows only one side of the moon to the earth















### iii) Airline Flights East vs. West

#### Recommended departing flights How our sort order works

7:00am - 3:35pm Los An... (LAX) - Boston (BOS) JetBlue Airways

9:20pm - 5:55am <sup>-1</sup> Los An... (LAX) - Boston (BOS) 5h 35m (Nonstop)

5h 35m (Nonstop)

#### **Returning flights**

7:00am - 10:20am Boston (BOS) - Los An... (LAX)

6:00am - 9:22am Boston (BOS) - Los An... (LAX)

6h 22m (Nonstop)

6h 20m (Nonstop)

# iv) A Rare 6-Planet Alignment Reported on June 3, 2024



All About June's Rare 6-Planet Alignment, A stunning alignment of Mercury, Mars, Jupiter, Saturn, Uranus and Neptune occurred this summer in a phenomenon called the 'parade of planets'





- Spherical earth
  - Earth has diameter of 8,000 miles, circumference of ~25,000 miles
  - Moon has a diameter of 2160 miles
  - Sun is 400 times size of the moon
  - Sun is 109 times size of the earth
  - Sun is 93 million miles from the earth
  - Moon is 239,000 miles from the earth
  - Stars are outside of the solar system
- Flat earth concept
  - Earth is a round disk, ~25,000 miles in diameter
  - Dome is ~3,000 miles above the earth
  - Sun and moon are ~32 miles in diameter
  - Sun and moon rotate above the earth under the dome
  - Stars and 5 visible planets are in the dome

### Sun sun s

v) Sizes of Sun and Moon

Earth



#### <u>Sun's Distance</u> From An Observer

- Sun is a spotlight that illuminates different regions of the earth as it orbits
- Sun never "rises" or "sets"
- Observer A at sunrise
- Observer B at noon
- Sun size observed can differ
  by 6 times in flat earth model
- Sun size is the same in the spherical earth model



### Sunrise and Sunset









Sunrise and sunset show that the sun is spherical in shape and constant in size, as expected if the sun is 93M miles away

In flat earth model, vertical sun should appear about <u>6 times larger</u> <u>overhead</u> than when at a low angle to the horizon

Flat earth concept shows sun and moon about 32 miles in size. Spherical model shows the sun is 403 times larger than the moon.



### Stars in FE Concept

- All stars are in the dome
- Southern Cross constellation in southern hemisphere
- Polaris, the North Star, in the northern hemisphere

#### **Is the Earth Flat?**

If the earth were a flat disk about 24,000 miles in diameter, and if it were covered by a spherical ½ dome, the north star would be about 20,000 km above the north pole. But then the angle to the north star would be AT MOST 45° from any place on earth! Anyone living south of Bangor, Maine knows this is false.



If you calculate the angle  $(\ominus)$ for different latitudes on a flat earth, you get the blue line on the chart to the right. But if you measure the actual values you get the red line. There is only one answer to this: The earth is a globe!



### FE Dome Problem

The diagram below shows how a flat earth would produce observations contrary to what we see. e.g. navigators in the northern hemisphere have long known that the angle of Polaris to the horizon equals the latitude. However, on the flat earth, the angle could never be less than 45°.

#### Is the Earth Flat?

If the earth were a flat disk about 24,000 miles in diameter, and if it were covered by a spherical ½ dome, the north star would be about 20,000 km above the north pole. But then the angle to the north star would be AT MOST 45° from any place on earth! Anyone living south of Bangor, Maine knows this is false.



If you calculate the angle  $(\Theta)$ for different latitudes on a flat earth, you get the blue line on the chart to the right. But if you measure the actual values you get the red line. There is only one answer to this: The earth is a globe!



#### No, the earth is not flat!

#### Beware of flat-earth charlatans! For help, see creation.com/refuting-flat-earth



# More Spotlight Sun Issues

- Sun (and moon) rotate in the sky without gravity?
- Sunrise and sunset are never below the horizon
- Can't explain what causes a lunar eclipse
- Can't predict start, stop, or trajectory of a solar eclipse
- During sunrise, we observe top of mountain illuminated before the foothills (not with flat earth)
- Can never illuminate the "Ice Wall" at the same time
- What causes the earth's magnetic field?
- Can't explain four seasons
- Can't explain solstices summer, winter, equinoxes

# vii) Spotlight Sun Cannot Explain Solstices





#### **Earth's equinoxes and solstices**



Shows Seasonal Configuration of Earth And Sun

Source: TimeAndDate.com

**BUSINESS INSIDER** 





# Equinoxes, Solistices, and Seasons

- Sun rises due east and sets due west on the equinoxes
- At the December solistice, sun rises south of east and sets south of west



The sun's rays along path a are spread over a larger area than sun's rays along path b. This dilutes the energy along path a than along path b, resulting in less heating. Image by Pengo, via Wikimedia Commons.

# Equatorial System & Ecliptic System







### Summer and Winter Solstices

# **June Solstice**



# **December Solstice**





#### summer solstice (June 21)



# Winter Solstice December 21, 2019 10:19 PM CST

In the Northern Hemisphere, the winter solstice occurs when the sun is directly overhead the Tropic of Capricorn, or 23.5° south latitude.

Tropic of Cancer

Equatr

Tropic of Capricor





#### **Earth during the December solstice**



# Solstice Predictions in Flat Earth Concept



- Zetetic model
- North pole in the center
- Sun circles above earth around axis through North Pole
- Radial distance from North Pole to Sun smallest on June Solstice
- Radial distance greatest on December Solstice
- How can Sun rise south of east and set south of west?
- Sun is perpetually above the flat earth; thus the sun only appears to rise and set

Tropic of Capricorn

#### **June Solstice**



North Pole, Arctic Circle, and Antarctic Circle are marked.



# **Flat Earth Test:**

How can a "spotlight" sun do this?

Spring/Fall Equinoxes



Sun

Distribution of daylight, at noon in Africa, at three times during the year January Solstice

Spotlight Sun in FE Model?

Credit: Dr. Carter CMI











# ix) Communication & Navigation Satellites

- Communication satellites TV, radio, phone services
  - Geostationary orbit (GEO) 22,236 miles above the earth
- Navigation satellites GPS for location and timing
  - Medium earth orbit (MEO) at 12,550 miles above the earth
- Earth observation gather info for weather forecasting
  - Low earth orbit (LEO) 100 to 1200 miles above the earth,
- Scientific research and exploration, including space
  - Orbit (GEO) at 10's 100's of thousand miles above earth
- Military reconnaissance, surveillance
  - LEO, MEO and GEO
- Space stations, e.g. ISS research and habitation
  - Orbit the earth at about 260 miles above the earth 101









### Global Positioning System (GPS)

- 24 satellites revolving around the earth twice at an altitude of 12,500 miles above the earth
- Provide geolocation and time info to GPS receivers anywhere on earth with line of sight to 4+ GPS satellites
- Special and general relativity predicted that clocks on GPS satellites, as observed by those on Earth, run **38 microseconds faster per day** than those on the earth
- The design of GPS corrects for this difference; because without doing so, GPS calculated positions would accumulate errors of up to 6 miles per day

https://en.wikipedia.org/wiki/Global\_Positioning\_System



## POH & Schuler Tuning

- Pilot's Operating Handbook (POH)
  - Used by pilots in flight navigation
  - Chapter 16 on Navigation:
  - "signals follow the <u>curvature of the earth</u>"
  - GPS is available for use under Visual Flight Rules (VFR)
- Schuler Tuning design principle for inertial navigation systems
  - Accounts for the <u>curvature of the earth</u>
  - Used in submarines, ships, aircraft, etc.
  - Gives correct directions on spherical earth



### x) Land Surveying Compensation

- Corrections for earth curvature and refraction
- Article on <u>curvature and refraction</u> in leveling surveying
- The combined error due to curvature and refraction







### From Range Table in US Navy Manual

Range	Angle of	Danger space	Change in height of	Curvature	Range Correction
	Fall	for a target	impact for variation of 100 vards in sight		for Curvature
		Lo rece magn	bar		
	_				
Yards	Degree	Yards	Feet	Feet	Yards
17000	11°42'	32	62	62	100
17100	11°48'	32	63	63	100
17200	11°54'	32	63	64	101
17300	12°00'	31	64	64	101
17400	12°07'	31	64	65	101
17500	12°13'	31	65	66	101
17600	12°19'	31	66	67	102
17700	12°25'	30	66	67	102
17800	12°32'	30	67	68	102
17900	12°38'	30	67	69	103
18000	12°44'	30	68	70	103
18100	12°50'	29	68	71	103
18200	12°57'	29	69	71	103
18300	13°03'	29	70	72	104
18400	13°09'	29	70	73	104
18500	13°16'	28	71	74	104
18600	13°22'	28	71	74	104
18700	13°29'	28	72	75	105
18800	13°35'	28	72	76	105
18900	13°42'	27	73	77	105
19000	13°48'	27	74	78	105

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#### Table of Curvatures For Horizontal Ranges

	Curvature of the Earth (ft)									
Range (yds)	0	100	200	300	400	500	600	700	800	900
1000	0.2	0.3	0.3	0.4	0.4	0.5	0.6	0.6	0.7	0.8
2000	0.9	0.9	1.0	1.1	1.2	1.3	1.5	1.6	1.7	1.8
3000	1.9	2.1	2.2	2.3	2.5	2.6	2.8	2.9	3.1	3.3
4000	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	5.0	5.2
5000	5.4	5.6	5.8	6.0	6.3	6.5	6.7	7.0	7.2	7.5
6000	7.7	8.0	8.3	8.5	8.8	9.1	9.4	9.7	9.9	10.2
7000	10.5	10.8	11.1	11.5	11.8	12.1	12.4	12.8	13.1	13.4
8008	13.8	14.1	14.5	14.8	15.2	15.5	15.9	16.3	16.7	17.0
9000	17.4	17.8	18.2	18.6	19.0	19.4	19.8	20.2	20.7	21.1
10000	21.5	22	22	23	23	24	24	25	25	26
11000	26	26	27	27	28	28	29	29	30	30
12000	31	31	32	33	33	34	34	35	35	36
13000	36	37	37	38	39	39	40	40	41	42
14000	42	43	43	44	45	45	46	46	47	48
15000	48	49	50	50	51	52	52	53	54	54
16000	55	56	56	57	58	59	59	60	61	61
17000	62	63	64	64	65	66	67	67	68	69
18000	70	70	71	72	73	74	74	75	76	77
19000	78	78	79	80	81	82	83	83	84	85
20000	86	87	88	89	89	90	91	92	93	94
21000	95	96	97	98	98	99	100	101	102	103
22000	104	105	106	107	108	109	110	111	112	113
23000	114	115	116	117	118	119	120	121	122	123
24000	124	125	126	127	128	129	130	131	132	133
25000	134	135	137	138	139	140	141	142	143	144
26000	145	146	148	149	150	151	152	153	154	156
27000	157	158	159	160	161	163	164	165	166	167
28000	169	170	171	172	173	175	176	177	178	180
29000	181	182	183	185	186	187	188	190	191	192
30000	194	195	196	197	199	200	201	203	204	205
31000	207	208	209	211	212	213	215	216	21/	219
32000	220	222	223	224	226	227	229	230	231	233
33000	234	236	237	238	240	241	243	244	246	247
34000	249	250	252	253	254	256	257	259	260	262
35000	263	265	266	268	269	271	273	274	276	277
36000	2/9	280	282	283	285	286	288	290	291	293
37000	294	296	298	299	301	302	304	306	307	309
38000	311	312	314	315	317	319	320	322	324	325
39000	327	329	330	332	334	336	537	339	541	342
40000	344									

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## xii) Antarctica Can't Be An Ice Wall

- 5<sup>th</sup> largest continent
- Map with South Pole, camps, stations, etc.
- Pie-shaped claims by different countries
  - UK, Argentina, Chile
  - New Zealand
  - Australia
  - Norway
  - France





Picture of Antarctica taken from Galileo space probe on December 8, 1990



# Challenges for Flat Earthers in Astronomy

- 1) Lunar and solar eclipse prediction
- 2) Rare 6-Planet Alignment
- 3) Stars rotating around celestial poles
- 4) Stars, Polaris, Southern Cross
- 5) Flat Earth dome with Sun and Moon inside
- 6) Solstice Predictions in FE Concept
- 7) 8 places on earth where sun never sets
- 8) Geostationary satellites
- 9) Global Positioning System (GPS)
- 10) Low Earth Orbit satellites







# More Challenges for Flat Earthers

- Antarctica wall vs. 5<sup>th</sup> largest continent.
- 44 Government documents
- Map projections & Gleason Map
- Scale to measure distance on FE map cannot be shown
- Longitude (meridian) and latitude lines on Gleason map
- Flying from Australia to certain parts of the Antarctic would take a long time
- Why, if the earth is flat
- Angles to North Pole from anywhere on FE can't be less than 45 degrees - CMI



## Flat Earth Assumptions

- 1) Gravity is NOT a law of nature
- 2) Things fall down because of density and buoyancy
- 3) Earth is stationary and does not rotate
- 4) Space does not exist
- 5) Nothing can orbit the earth
- 6) Newton's 3 laws of motion are fake
- 7) Kepler's 3 laws of planetary motion are fake
- 8) There are no satellites or Space Stations
- 9) Astronauts have not been to the moon
- 10) NASA lied about everything they claimed
- 11) NASA photos from and in space are fake
- 12) Antarctic is an ice wall around the earth disc



## Conclusions

- 1) Some ancient cultures did believe in a Flat Earth
- 2) The Bible text does not require a Flat Earth
- 3) Observations from the 5<sup>th</sup> century BC to the 19<sup>th</sup> century AD showed Earth to be a rotating sphere
- 4) An incomplete experiment by Rowbotham in 1838 renewed interest in a Flat Earth
- 5) Scientific observations show the earth to be a Sphere
- 6) The Flat Earth model fails to explain observations
- 7) Wide use of social media revived interest in Flat Earth
- 8) Assumptions made by Flat Earthers cannot be verified
- 9) Spherical Earth is supported by the Bible and by science



## **Thanks For Your Attention**



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Talks can be found here HeinzLycklama.com/messages

#### Reference Books on Flat Earth





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## What Is The Final Experiment?

 The Final Experiment is a way to settle the shape of the Farth debate. Both the flat earth side and the globe side agree that whether or not there is a 24-hour sun in Antarctica will confirm if we live on a flat plane or on a globe. A 24-hour sun cannot work on a flat plane in the south. And the sun cannot set on a globe during the southern summer.















## Prof Dave:10 Challenges for Flat Earthers

- Things fall down because of density and buoyancy
- I shouldn't be able to see this because 8 in. / miles\*2
- Water doesn't curve, water finds its own level
- How can our atmosphere be next to a vacuum?
- Show water sticking to a spinning ball
- Moonlight is cold
- Rivers can't flow uphill
- How is the earth closer to the sun in the winter?
- You believe in scientism
- You've all been indoctrinated! Brainwashed!