

WHO NEEDS PARANORMAL?

Reality is underrated

The Universe is weirder
and more wonderful than you think

Prof. Jaymie Matthews
UBC Physics & Astronomy



40 is the new 30

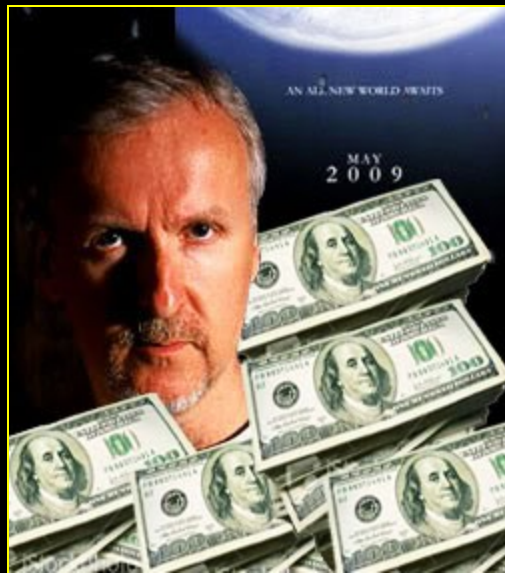
*40 is the
New 30*

Green is
the new
black



FROM THE DIRECTOR OF "TITANIC"

Blue is
the new
gold



AVATAR

AVATARMOVIE.COM



Avatar has made more money than any other film in history.

Or has it?

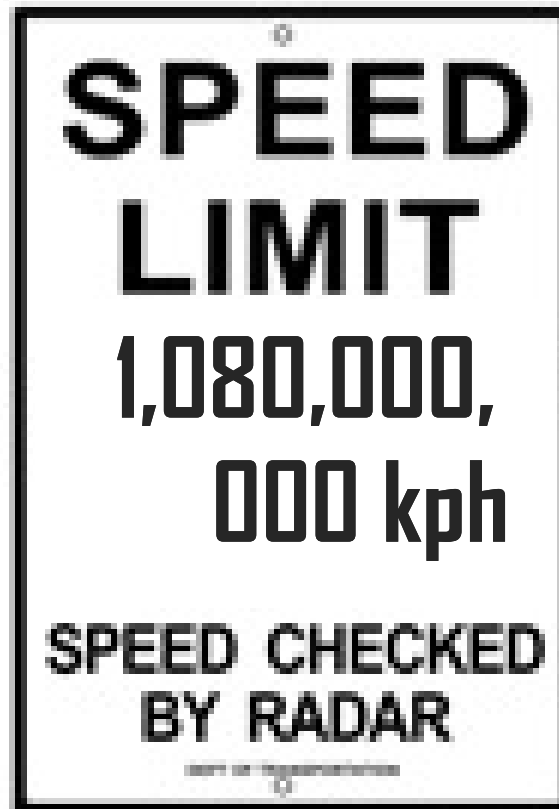
In science, and in life, you must calibrate your findings.

Check the units you use, and if their definition has changed.

**Avatar has made more money than any other film in history.
Or has it?**

**In science, and in life, you must calibrate your findings.
Check the units you use, and if their definition has changed.**

**There are fundamental
constants in nature
like the speed of light
which do not change**



**Avatar has made more money than any other film in history.
Or has it?**

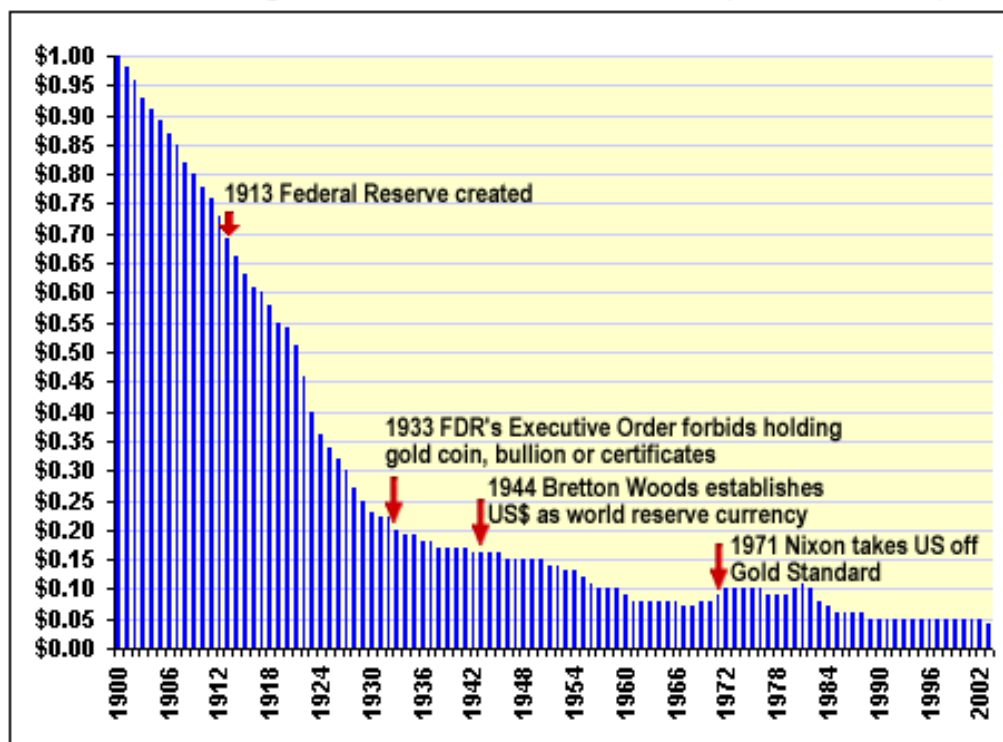
**In science, and in life, you must calibrate your findings.
Check the units you use, and if their definition has changed.**

**There are fundamental
constants in nature
like the speed of light
which do not change**

**The purchasing power
of the US dollar is not
a fundamental constant**

It changes over time

Purchasing Power of the US Dollar (1900 - 2003)



***BOX OFFICE INCOME* adjusted for inflation**

Rank	Title (click to view)	Studio	Adjusted Gross	Unadjusted Gross	Year^
1	Gone with the Wind	MGM	\$1,537,559,600	\$198,676,459	1939^
2	Star Wars	Fox	\$1,355,490,100	\$460,998,007	1977^
3	The Sound of Music	Fox	\$1,083,781,000	\$158,671,368	1965
4	E.T.: The Extra-Terrestrial	Uni.	\$1,079,511,500	\$435,110,554	1982^
5	The Ten Commandments	Par.	\$996,910,000	\$65,500,000	1956
6	Titanic	Par.	\$976,712,200	\$600,788,188	1997
7	Jaws	Uni.	\$974,679,800	\$260,000,000	1975
8	Doctor Zhivago	MGM	\$944,670,800	\$111,721,910	1965
9	The Exorcist	WB	\$841,427,600	\$232,671,011	1973^
10	Snow White and the Seven Dwarfs	Dis.	\$829,490,000	\$184,925,486	1937^

***BOX OFFICE INCOME* adjusted for inflation**

Rank	Title (click to view)	Studio	Adjusted Gross	Unadjusted Gross	Year^
1	Gone with the Wind	MGM	\$1,537,559,600	\$198,676,459	1939^
2	Star Wars	Fox	\$1,355,490,100	\$460,998,007	1977^
3	The Sound of Music	Fox	\$1,083,781,000	\$158,671,368	1965
4	E.T.: The Extra-Terrestrial	Uni.	\$1,079,511,500	\$435,110,554	1982^
5	The Ten Commandments	Par.	\$996,910,000	\$65,500,000	1956
6	Titanic	Par.	\$976,712,200	\$600,788,188	1997
7	Jaws	Uni.	\$974,679,800	\$260,000,000	1975
8	Doctor Zhivago	MGM	\$944,670,800	\$111,721,910	1965
9	The Exorcist	WB	\$841,427,600	\$232,671,011	1973^
10	Snow White and the Seven Dwarfs	Dis.	\$829,490,000	\$184,925,486	1937^
11	101 Dalmatians	Dis.	\$760,370,300	\$144,880,014	1961^
12	The Empire Strikes Back	Fox	\$747,154,600	\$290,475,067	1980^
13	Ben-Hur	MGM	\$745,780,000	\$74,000,000	1959
14	Avatar	Fox	\$733,951,000	\$733,951,000	2009
15	Return of the Jedi	Fox	\$715,792,100	\$309,306,177	1983^
16	The Sting	Uni.	\$678,377,100	\$156,000,000	1973
17	Raiders of the Lost Ark	Par.	\$670,759,500	\$242,374,454	1981^
18	Jurassic Park	Uni.	\$656,026,500	\$357,067,947	1993



Avatar is
the new
Ben-Hur



FROM THE DIRECTOR OF "TITANIC"



AVATAR

AVATARMOVIE.COM



FROM THE DIRECTOR OF "TITANIC"



STAR WARS
RETURN OF THE JEDI



AVATAR

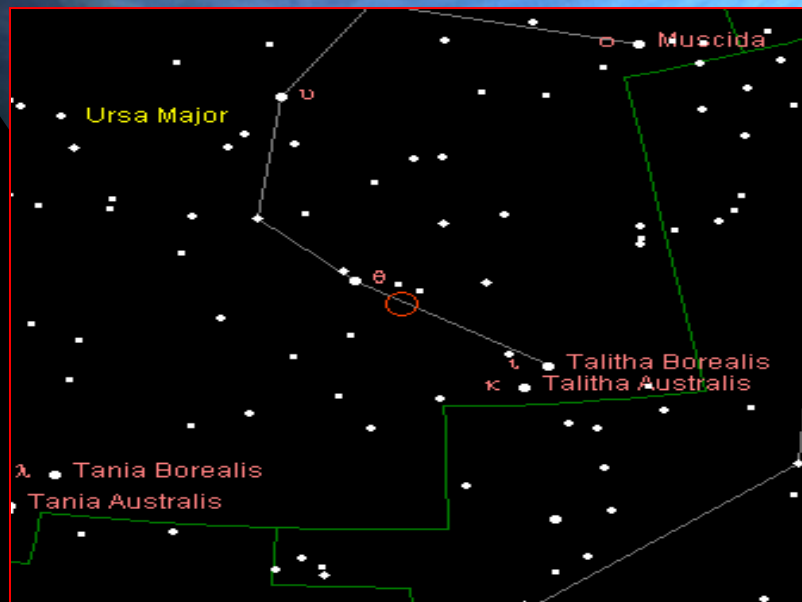
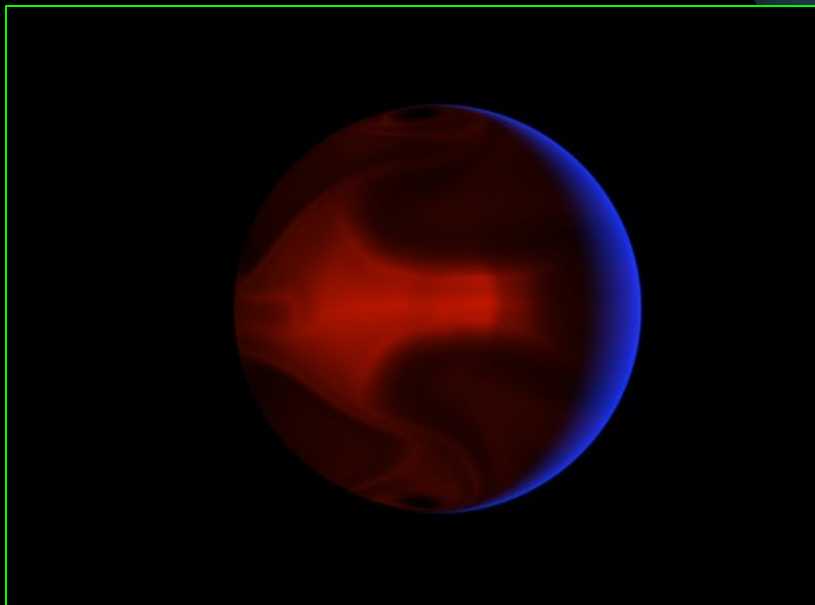
AVATARMOVIE.COM



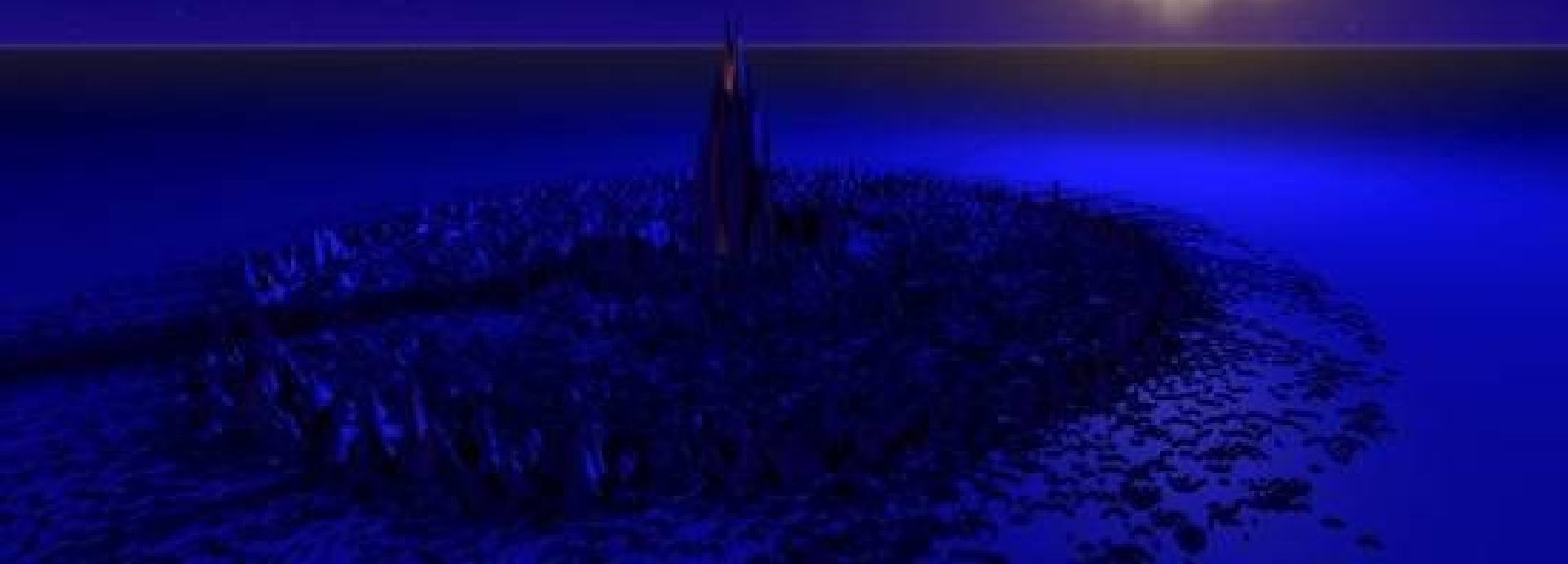
Pandora is the new Endor



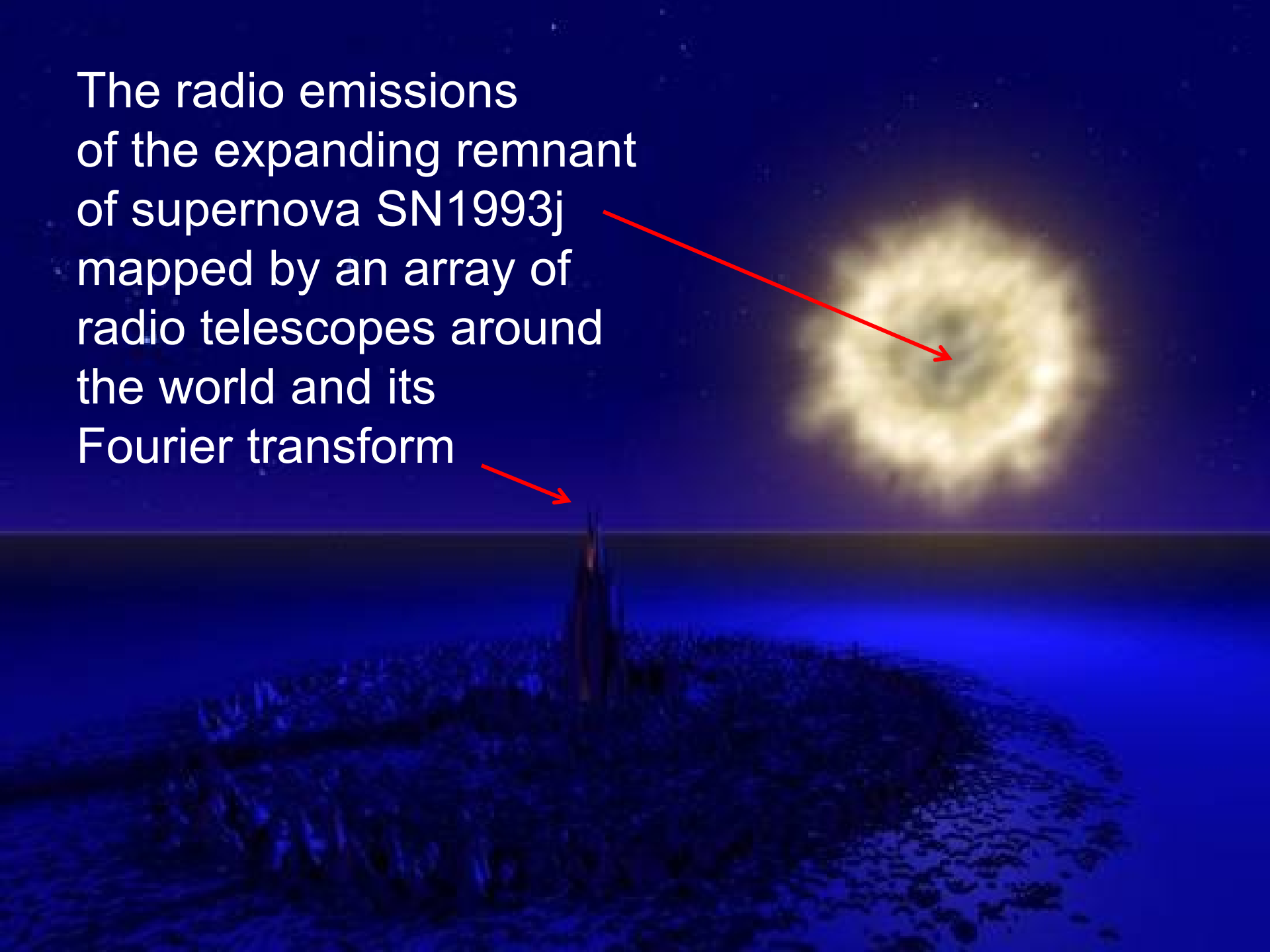
HD 80606 is a future Pandora



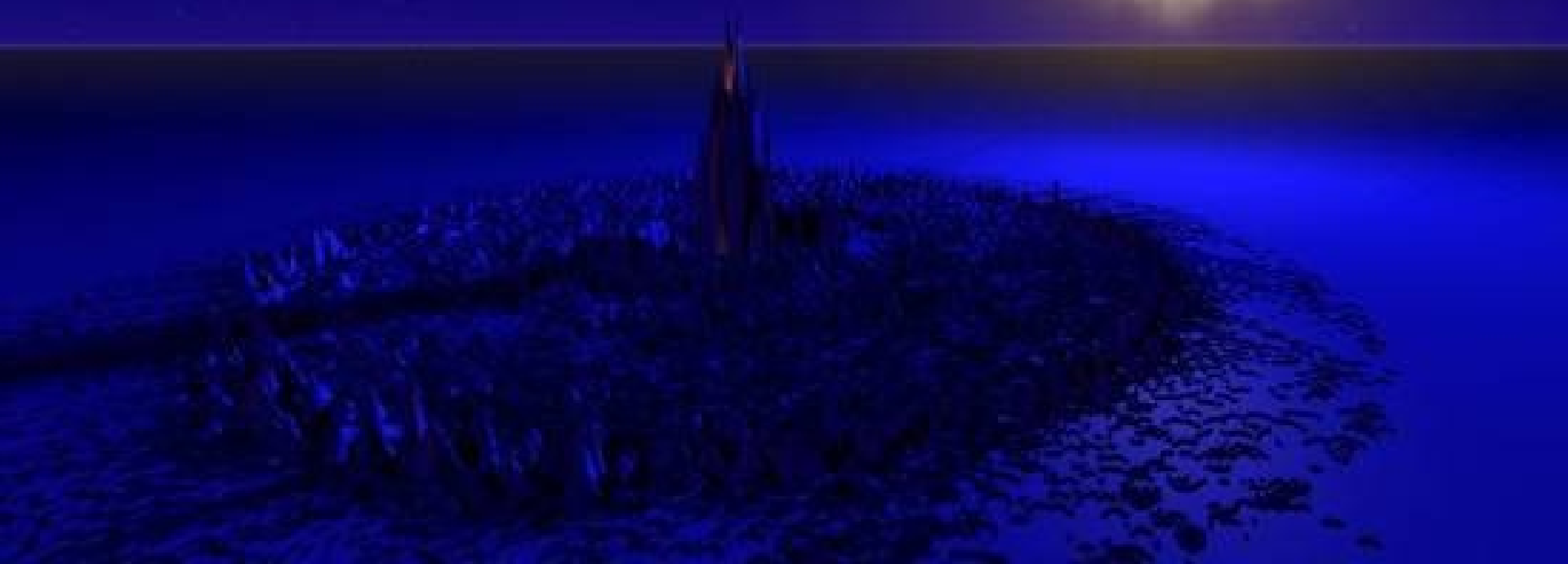
Normal is
the new
paranormal



The radio emissions
of the expanding remnant
of supernova SN1993j
mapped by an array of
radio telescopes around
the world and its
Fourier transform



Normal is
the new
paranormal



841 is
the new
nine

$$841 = 9$$

Number of known planets

7 January 1610

Total = 6

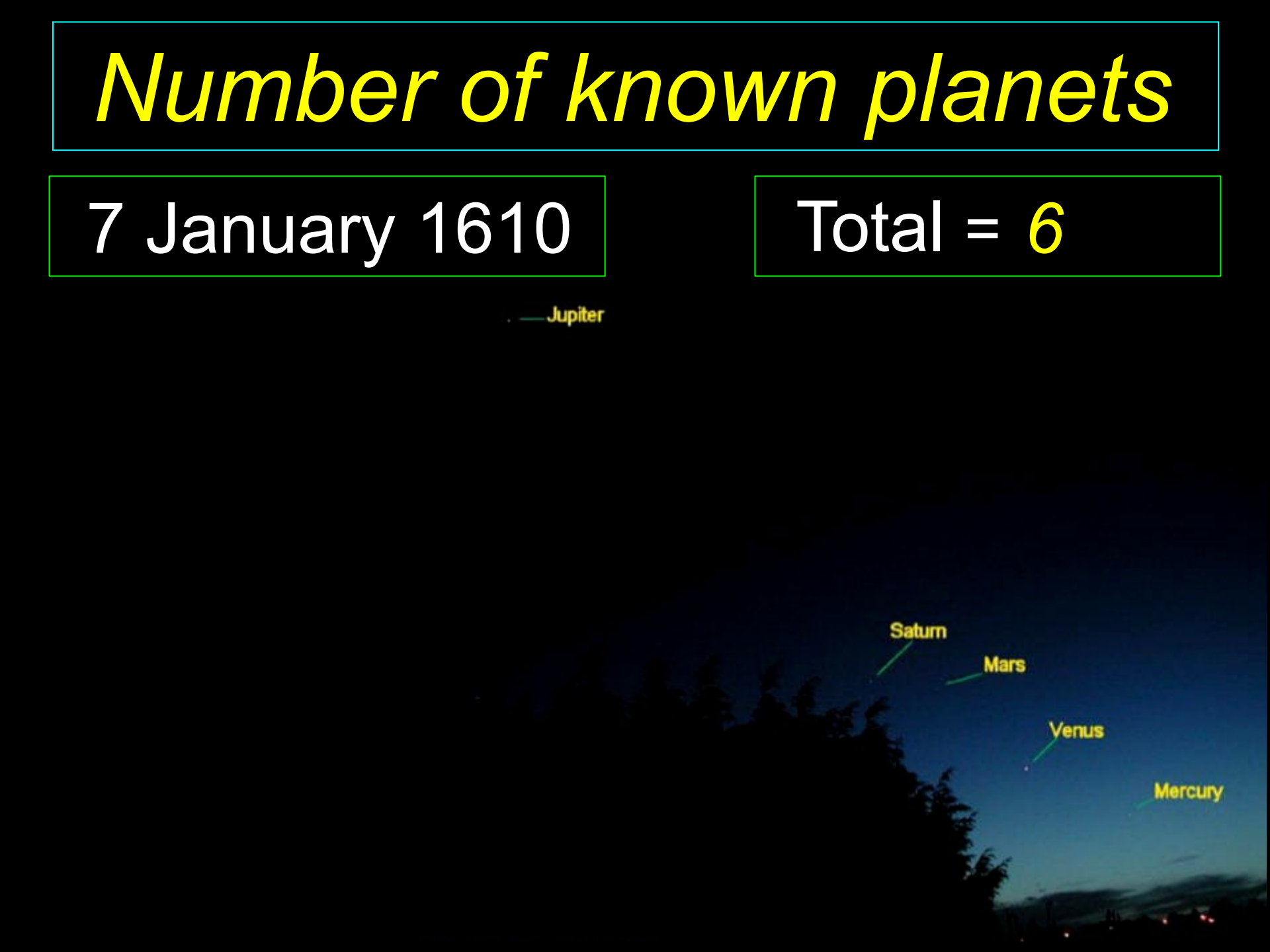
— Jupiter

Saturn

Mars

Venus

Mercury



Number of known planets

7 January 1610

Total = 6

Mercury



Venus

Mars

Jupiter

Saturn

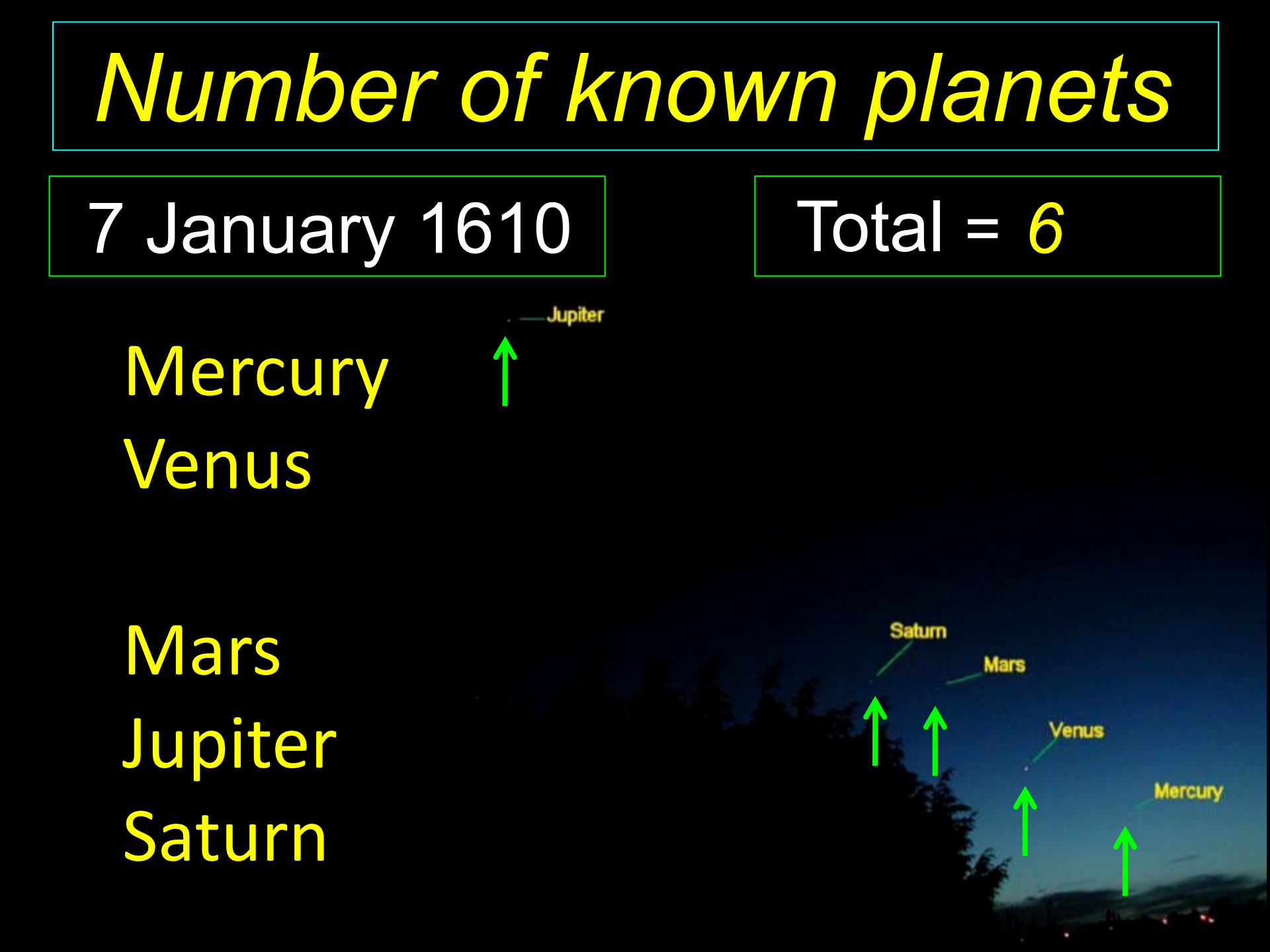
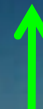
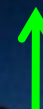
Jupiter

Saturn

Mars

Venus

Mercury

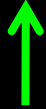


Number of known planets

7 January 1610

Total = 6

Mercury



Jupiter

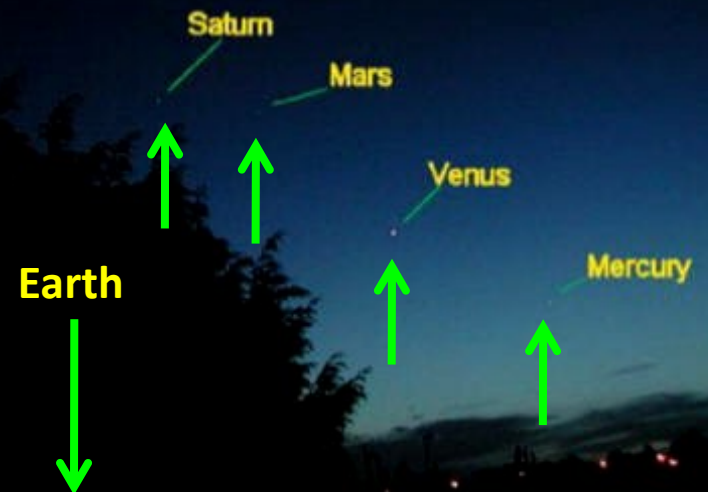
Venus

Earth

Mars

Jupiter

Saturn



Number of known planets

7 January 1610

Total = 6

Galileo



Jupiter



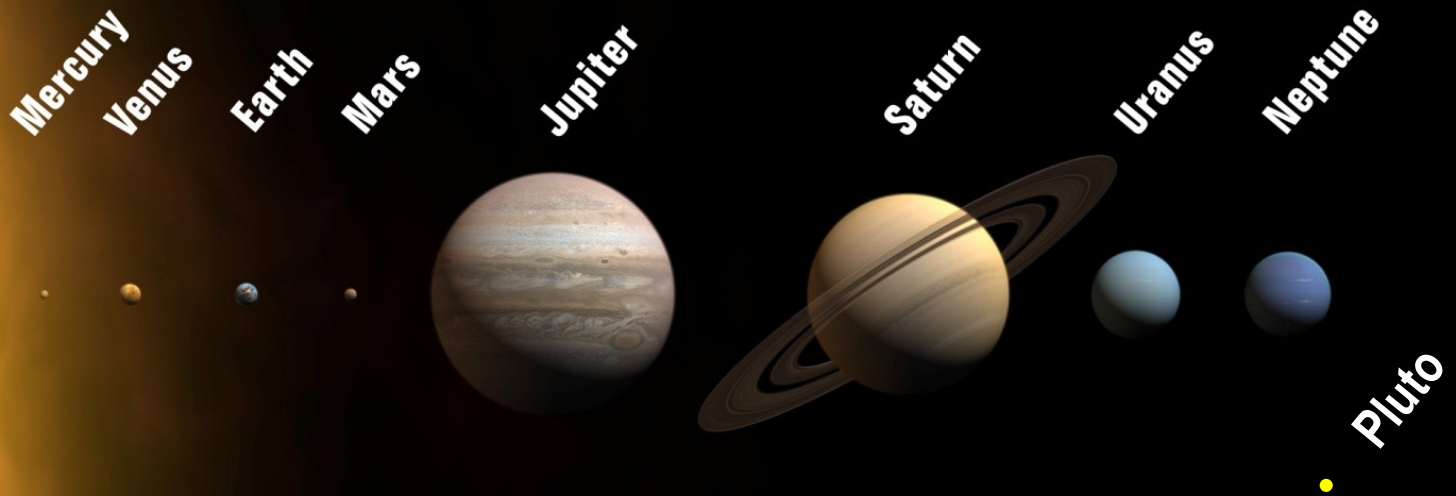
Observations Jupiter
1610

20. Jan. 12	○ **
30. Jan.	** ○ *
2. Feb.	○ ** *
3. Jan.	○ * *
3. Feb. 5.	* ○ *
7. Jan.	* ○ **
6. Jan.	** ○ *
8. Jan. 13.	* * * ○
10. Jan.	* * * ○ *
11.	* * ○ *
12. H. 4. 12.	* ○ *
13. Jan.	* * ○ *
14. Jan.	* * * ○ *

Number of known planets

7 January 1992

Total = 6 + 3

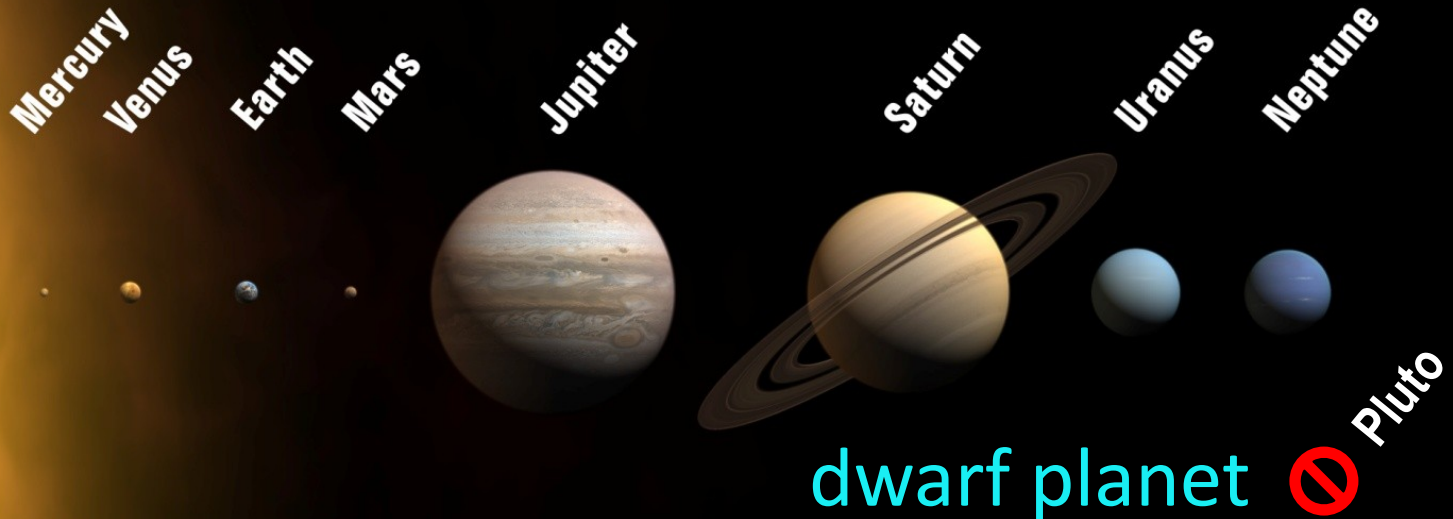


418 YEARS
AFTER THAT

Number of known planets

7 January 1992

Total = 6 + 2



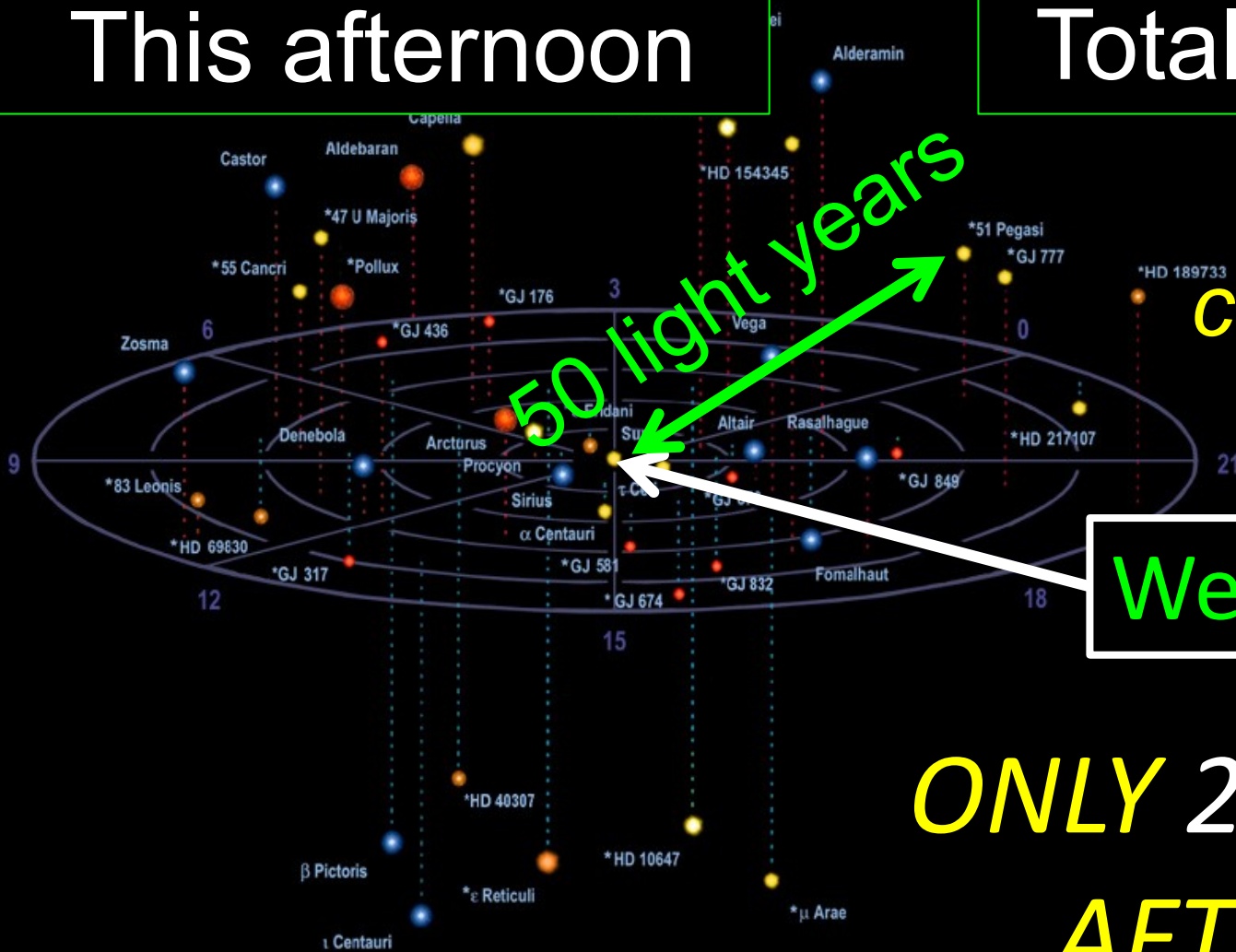
418 YEARS
AFTER THAT

Number of known planets

This afternoon

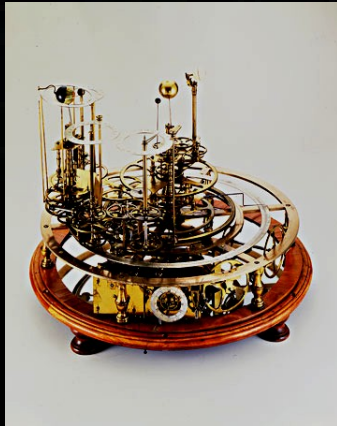
Total = 841

+ 2300
candidate
systems



**ONLY 20 YEARS
AFTER THAT**

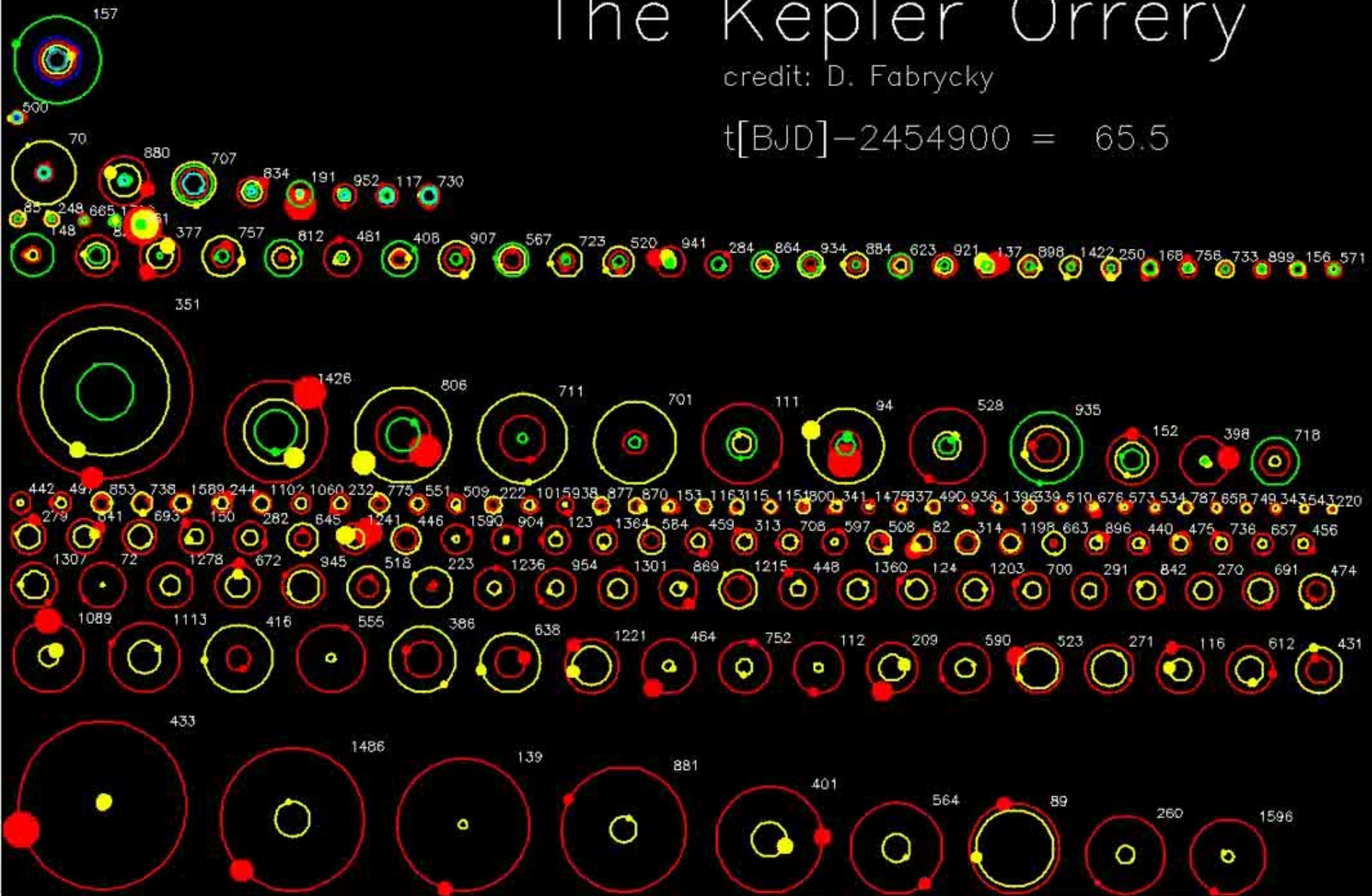
A mechanical Orrery



The Kepler Orrery

credit: D. Fabrycky

$t[\text{BJD}]-2454900 = 65.5$

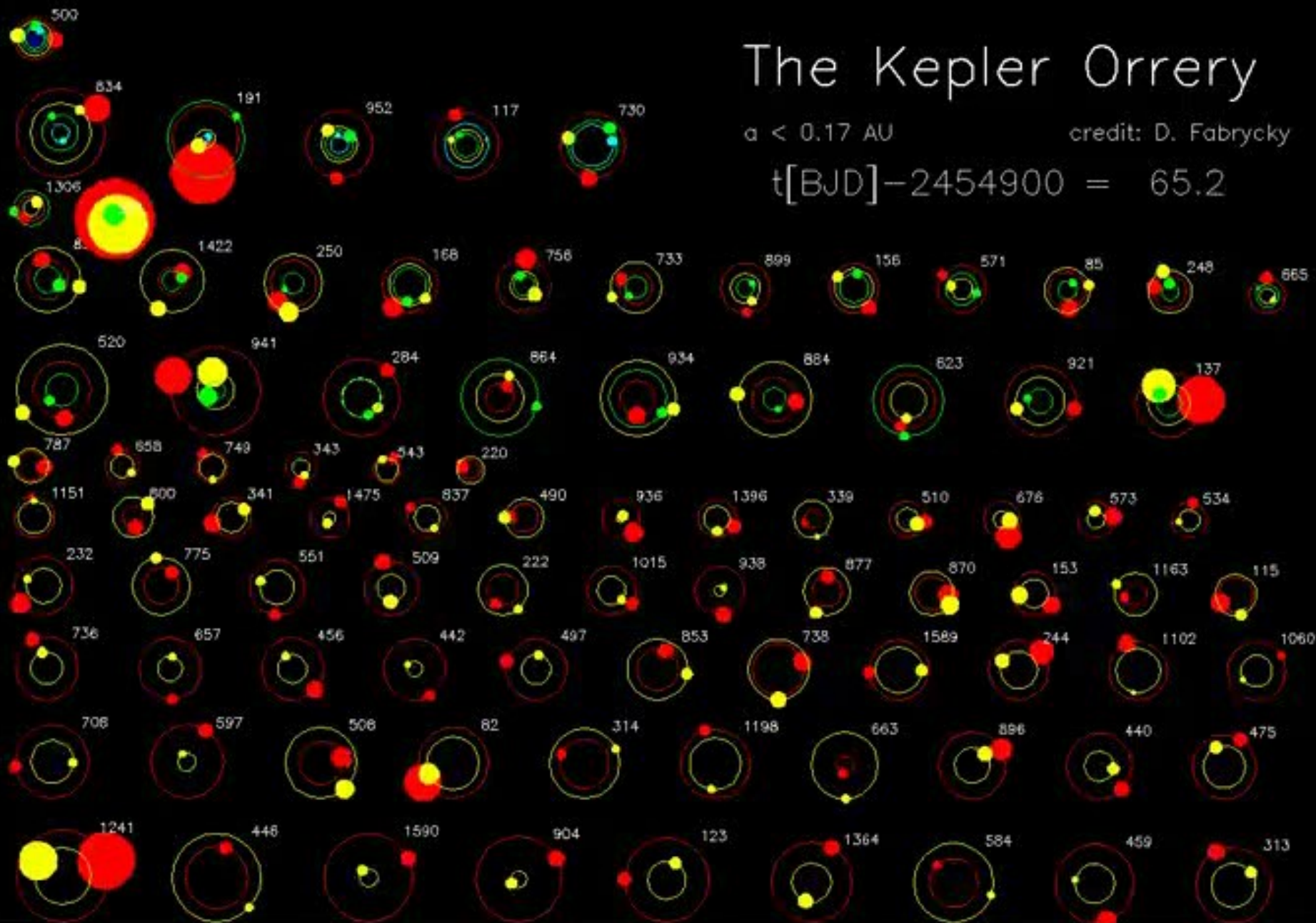


The Kepler Orrery

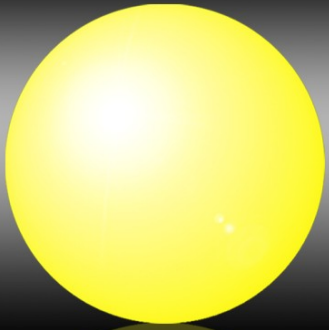
$a < 0.17$ AU

credit: D. Fabrycky

$t[\text{BJD}] - 2454900 = 65.2$

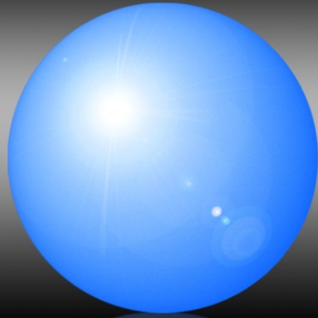


Kepler-7b



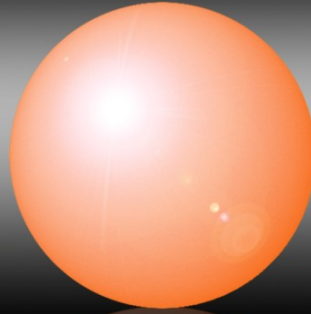
16.52 R_E

Kepler-5b



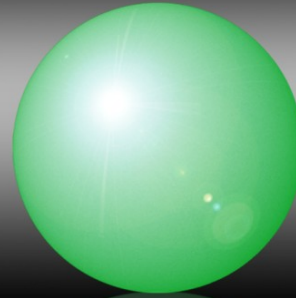
16.00 R_E

Kepler-8b



15.86 R_E

Kepler-6b

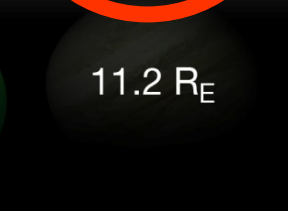
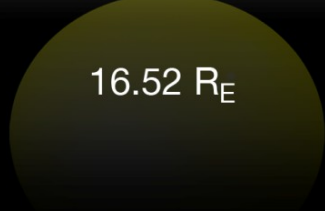


14.79 R_E

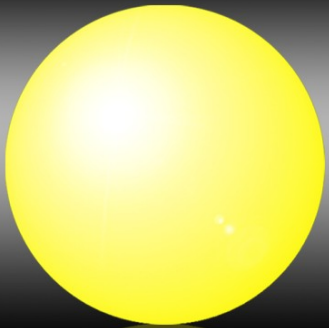
Jupiter



11.2 R_E

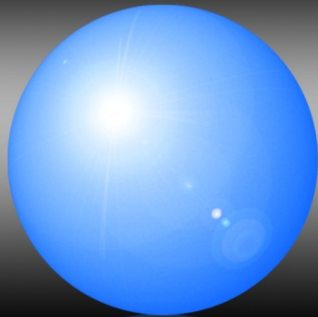


Kepler-7b



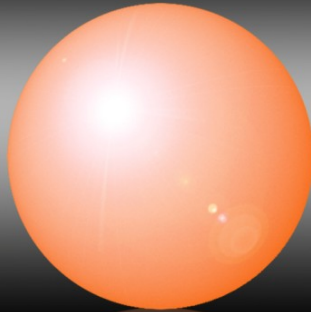
16.52 R_E

Kepler-5b



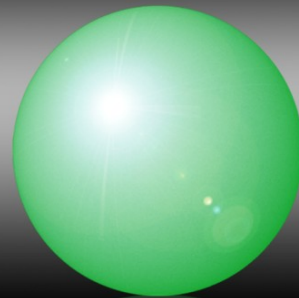
16.00 R_E

Kepler-8b



15.86 R_E

Kepler-6b



14.79 R_E

Jupiter



11.2 R_E

Kepler-9b



9.4 R_E

Kepler-9c



9.2 R_E

Kepler-4b



3.99 R_E

Kepler-9d



1.64 R_E

Kepler-10b



1.42 R_E

Earth

Earth

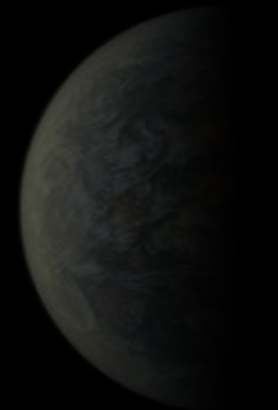
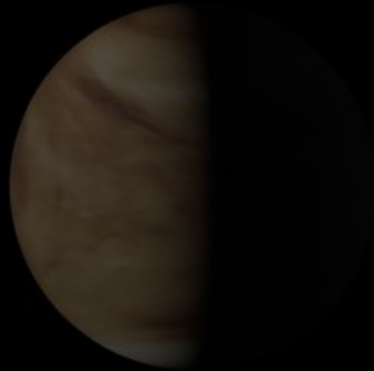
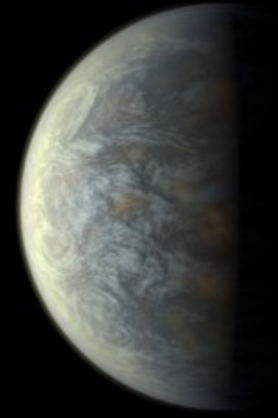
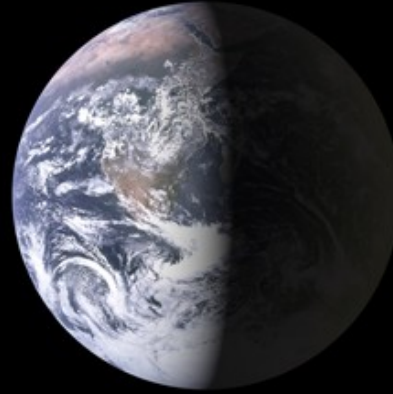
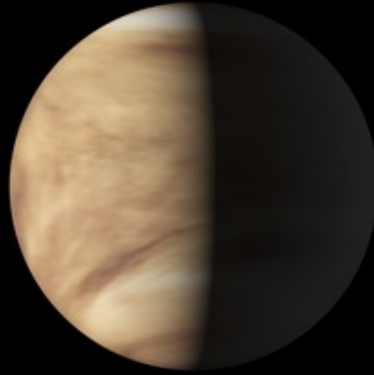


Kepler 20 e

Venus

Earth

Kepler 20 f



An artist's conception of an exoplanet system. A bright yellow star is on the left, with a small grey planet nearby. A large gas giant with yellow and white bands is on the right, with a smaller blue and purple planet in the foreground. The background is a dark space filled with stars.

Exoplanets
artist's conception

An artist's conception of an alien world system. A bright yellow star is in the upper left. A large, yellow and white striped planet (Jupiter-like) is on the right. A smaller, dark blue planet with a cracked surface is in the lower right. A small grey moon is in the middle left. The background is black with many small white stars.

Alien worlds
artist's conception



Alien worlds like Pandora

James Cameron's conception



Alien worlds like Pandora
scene from Avatar



Alien worlds like Pandora
scene from Avatar

HD 80606

EXCITING

Megrez

α

Dubhe

Phecda

β

Lynx

Talitha Borealis

κ

μ

Tania Australis

λ

46

Leo Minor

38

α

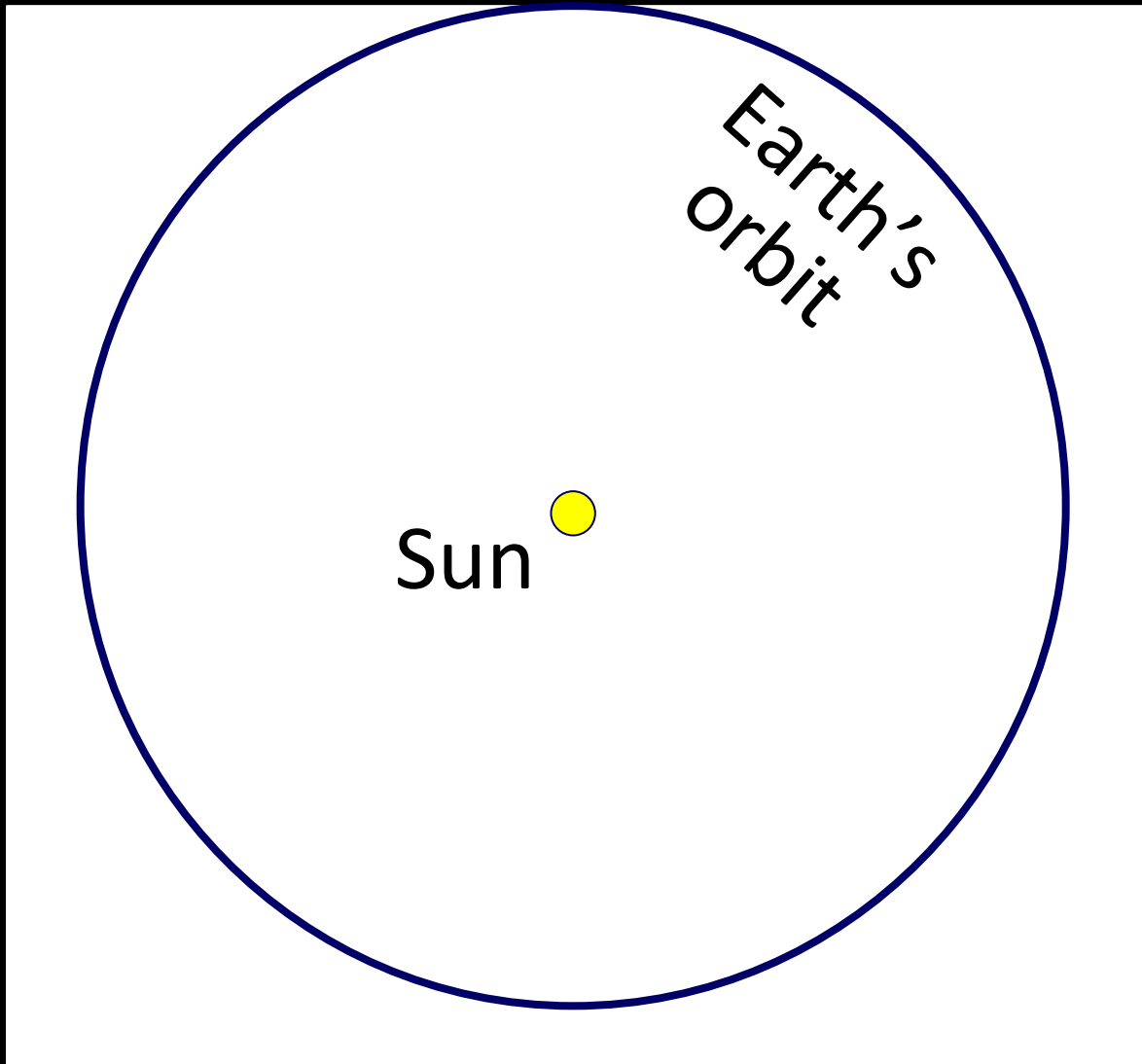


HD 80606



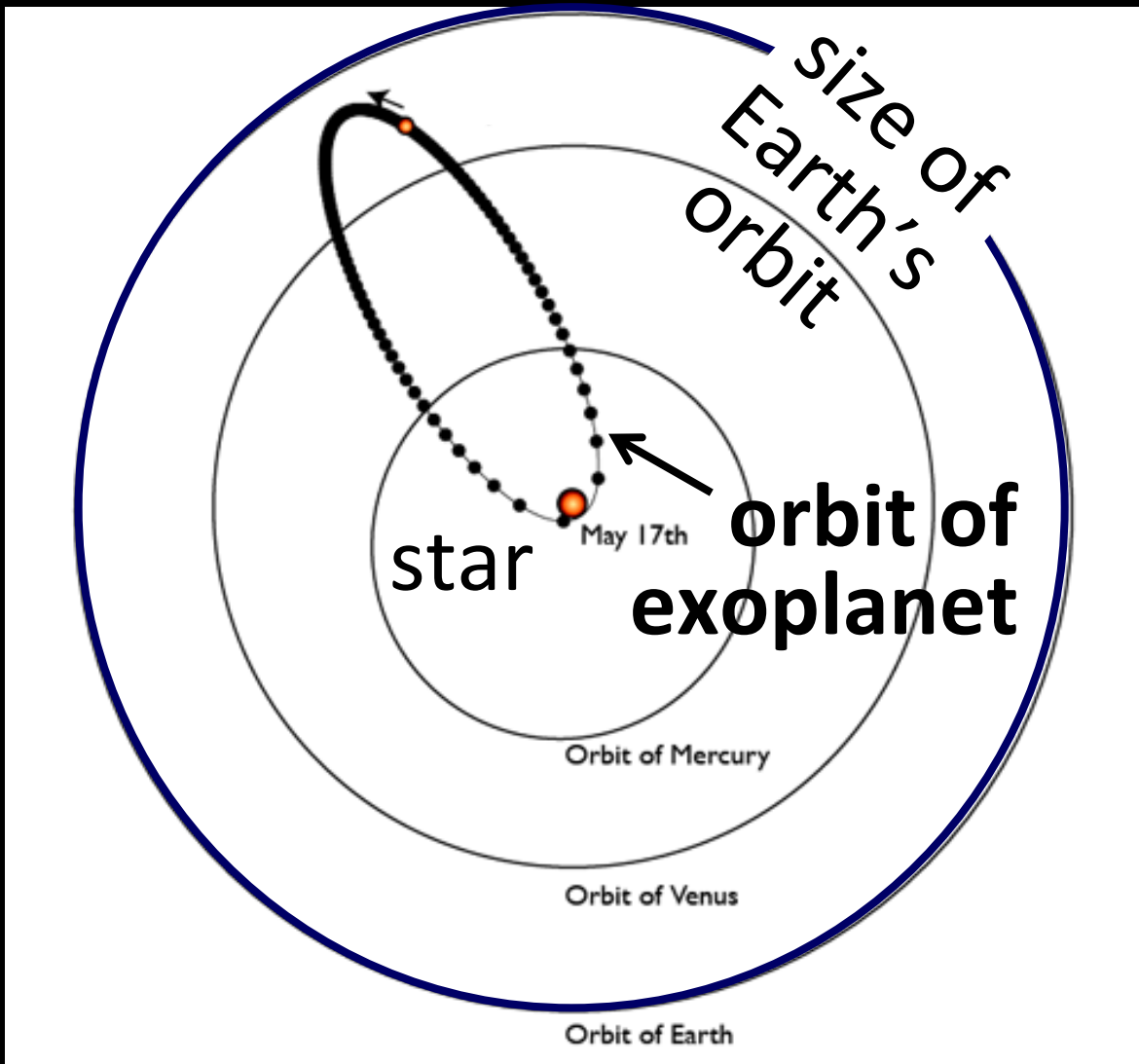
- ✓ distance from Earth = 58 light years
- ✓ one of a pair of stars similar to the Sun
- ✓ in the part of the sky with the Big Dipper

Planet Earth



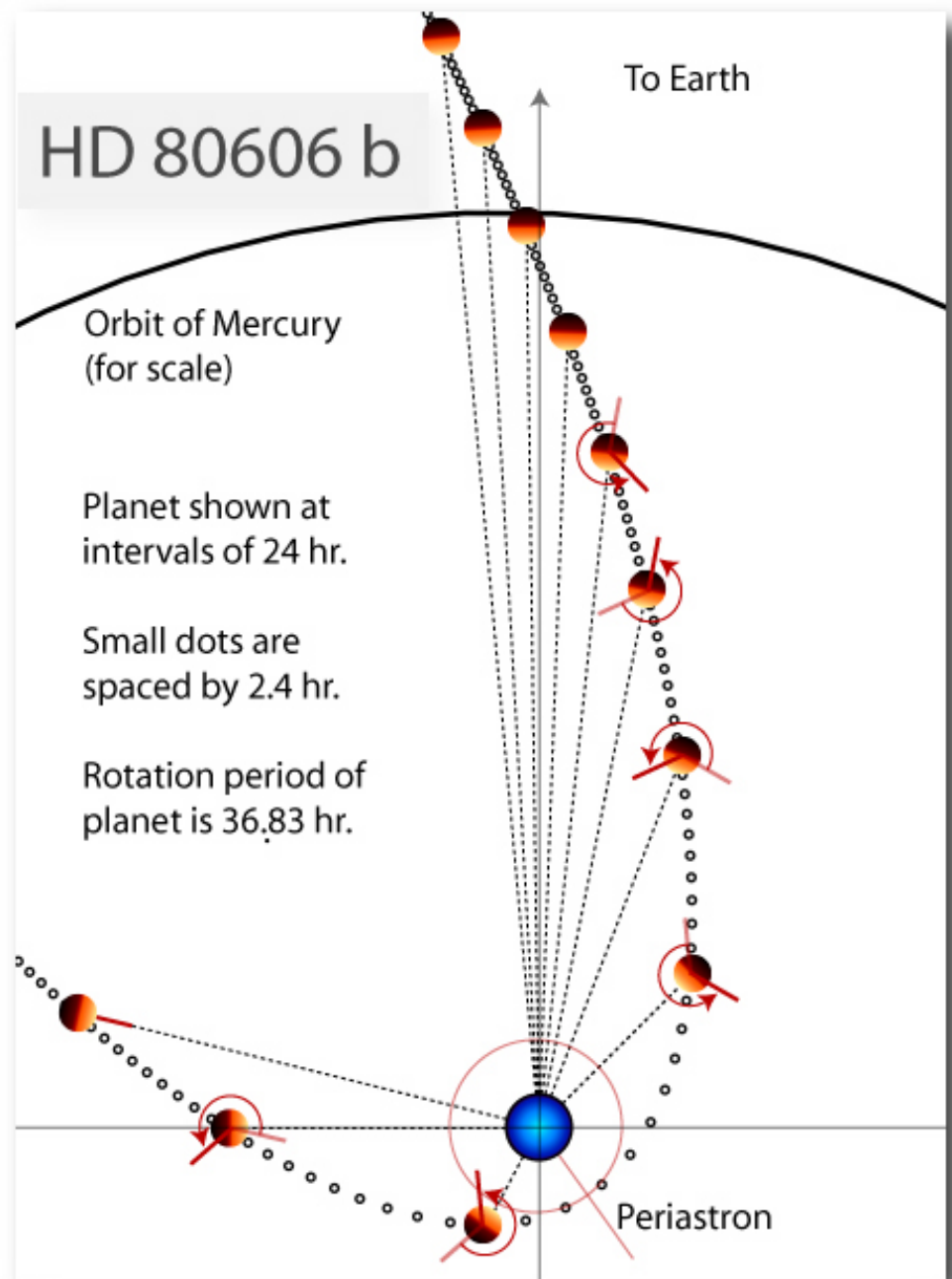
Our planet has a nearly **circular orbit** with a period of **365 $\frac{1}{4}$ days**

Planet HD 80806 b



This planet has a very **oval orbit** with a period of **112 days** that swoops barely above the surface of its parent star

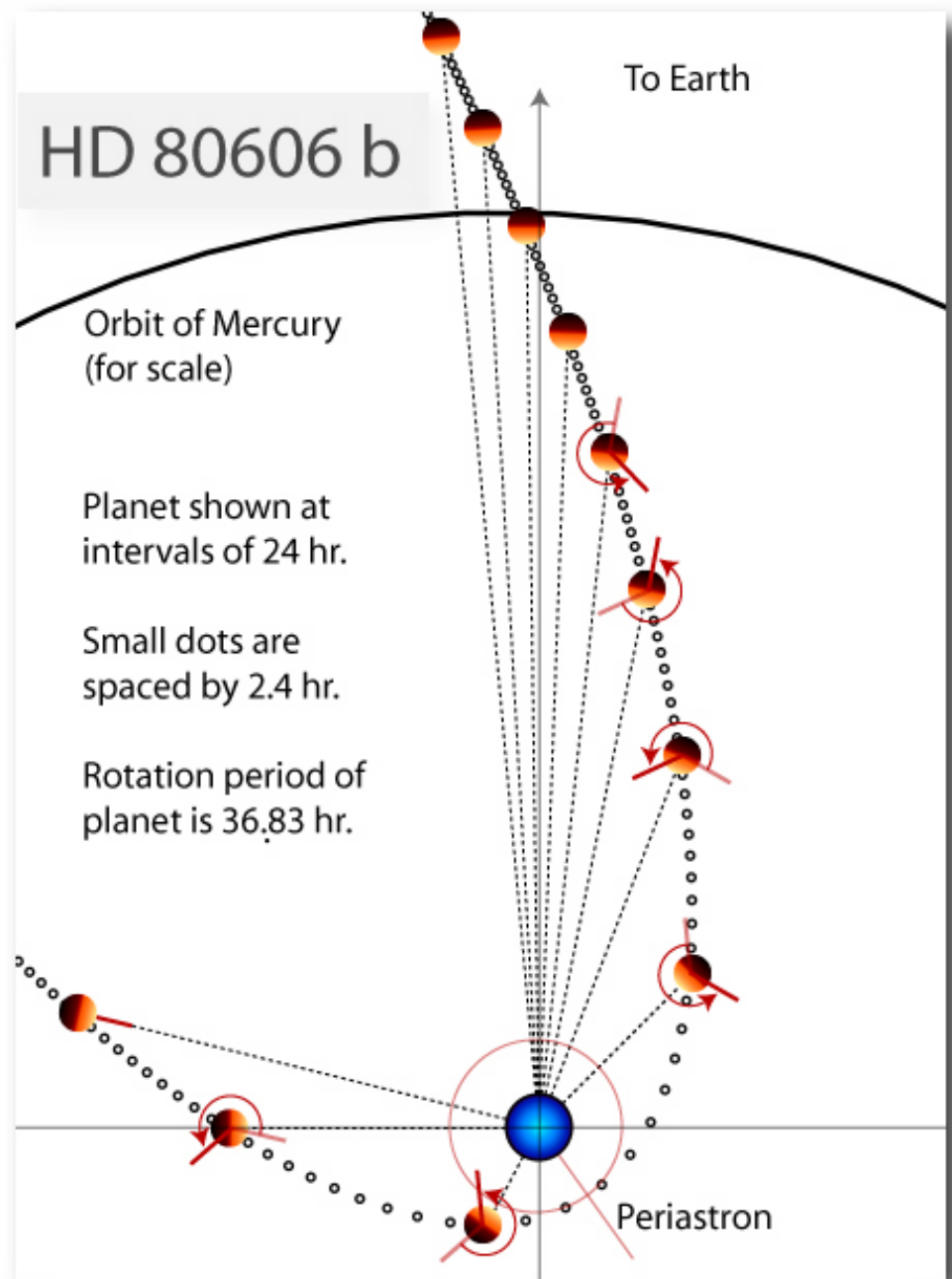
The planet moves fastest when it is closest to the star
Its distance from the star changes dramatically in only a few days



The planet moves fastest when it is closest to the star

Its distance from the star changes dramatically in only a few days

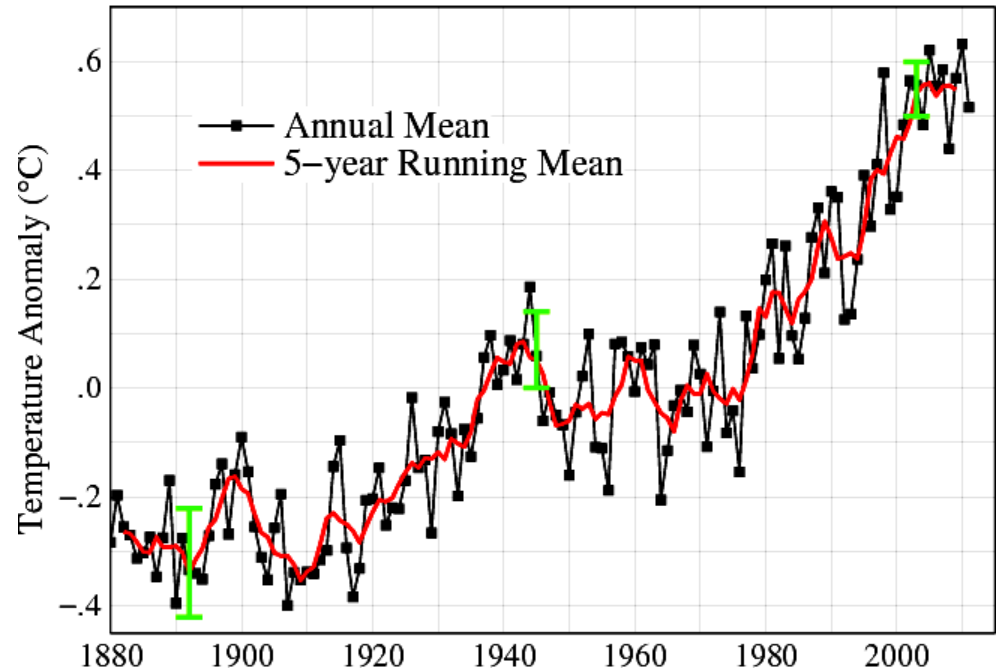
The fast change in sunlight changes **the whole planet's weather** in just a few hours



Climate change?

A rise of
1 or 2° Celsius
in a century?

The fast change
in sunlight changes
**the whole planet's
weather** in just
a few hours



global warming.
oh no.



Climate change?

A rise of
1 or 2° Celsius
in a century?

*How about
400°C in a week!!*

*A climate
rollercoaster*



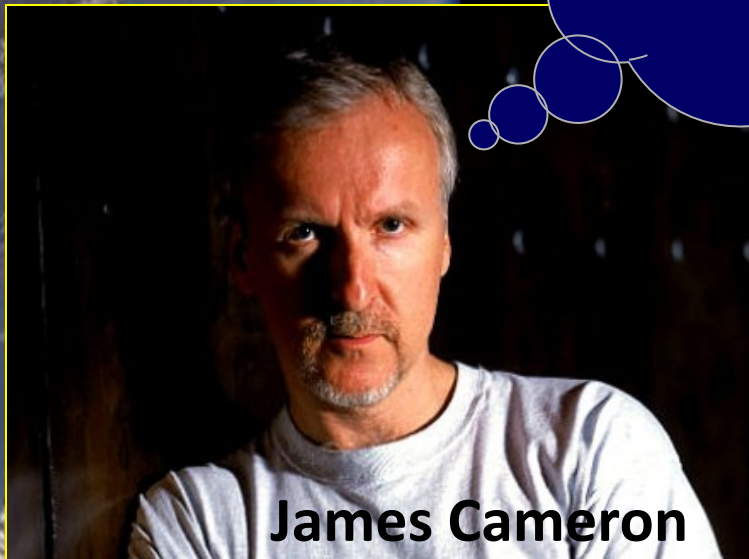
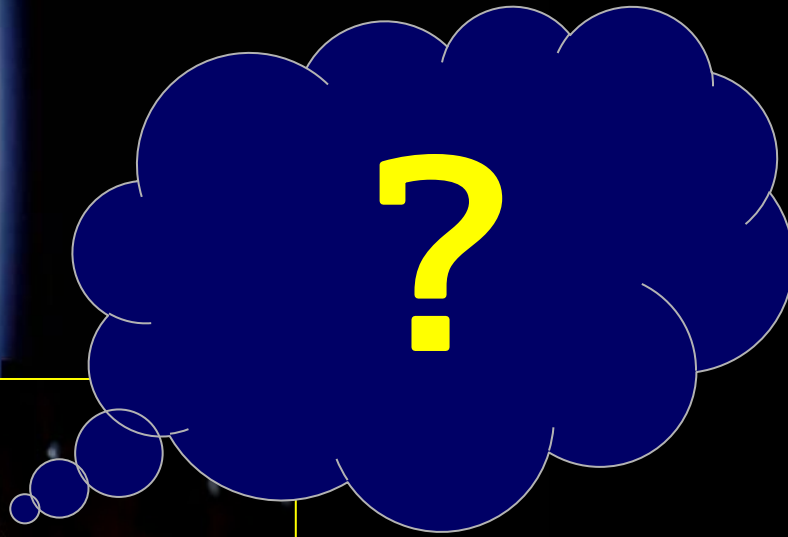
Today's alien weather forecast





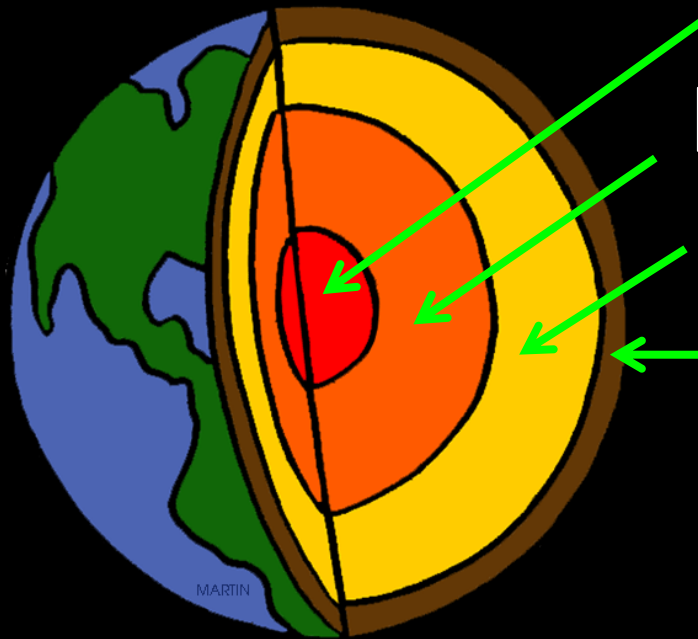
Alien worlds like Pandora
scene from Avatar

Where will Avatar 2 be set?

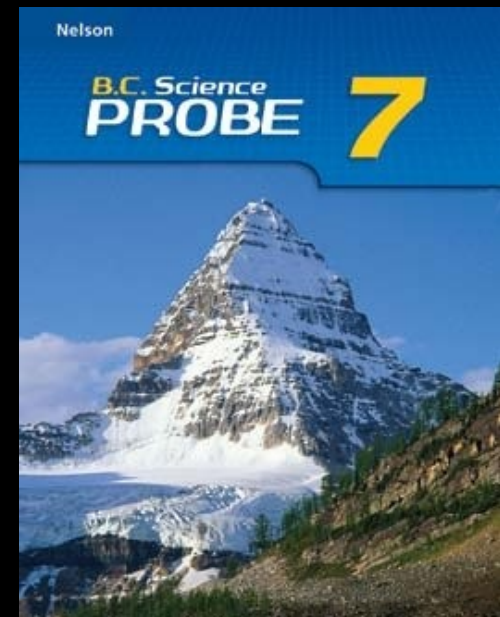


James Cameron

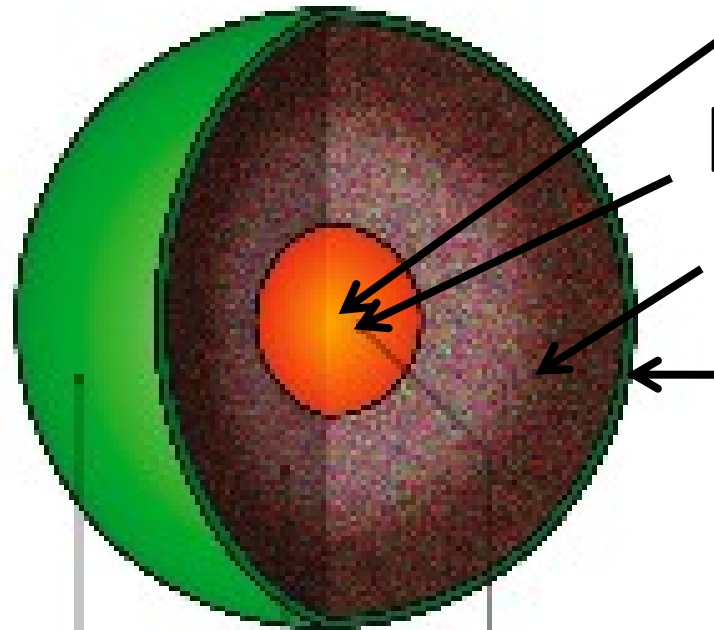
Earth



solid iron inner core
liquid iron outer core
semi-solid rock mantle
solid rock crust



superEarth



solid iron inner core
liquid iron outer core
semi-solid rock mantle
solid rock crust

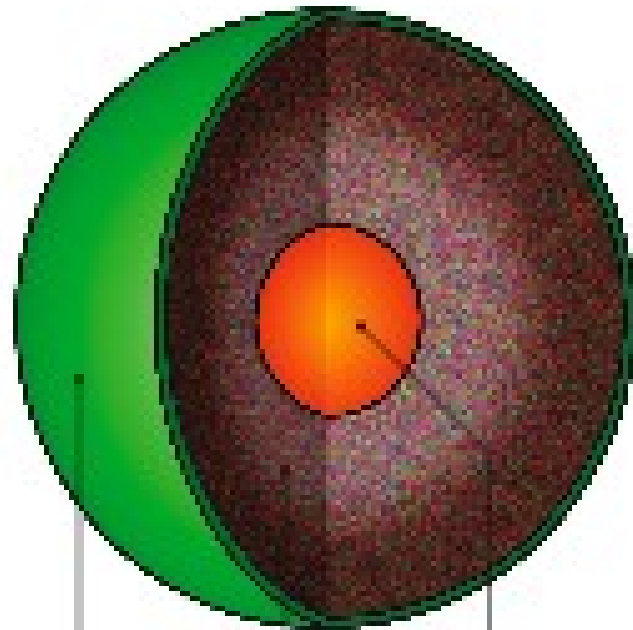
crust

silicate
mantle

iron
core



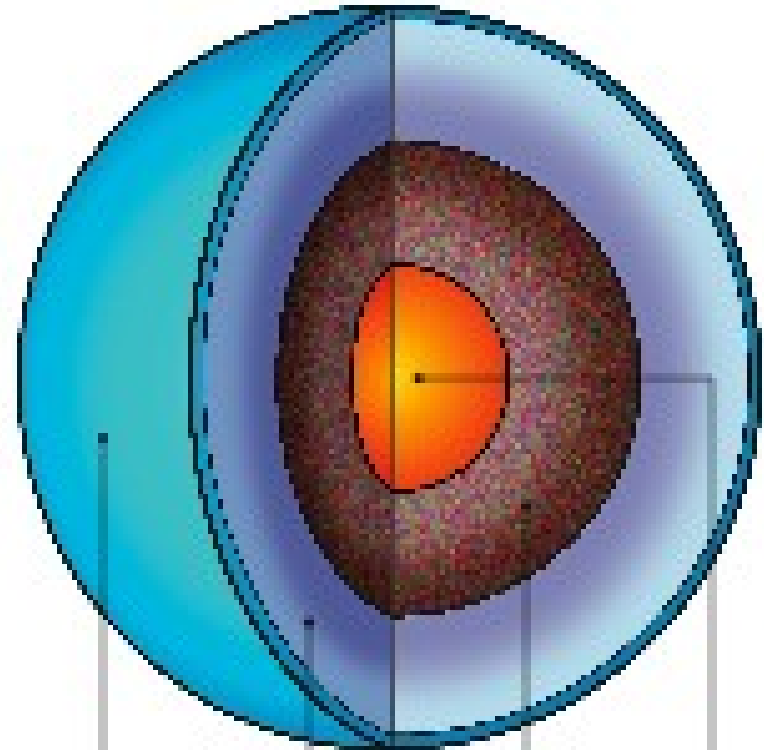
ocean superEarths



crust

silicate
mantle

iron
core



liquid
water
ocean

solid
water

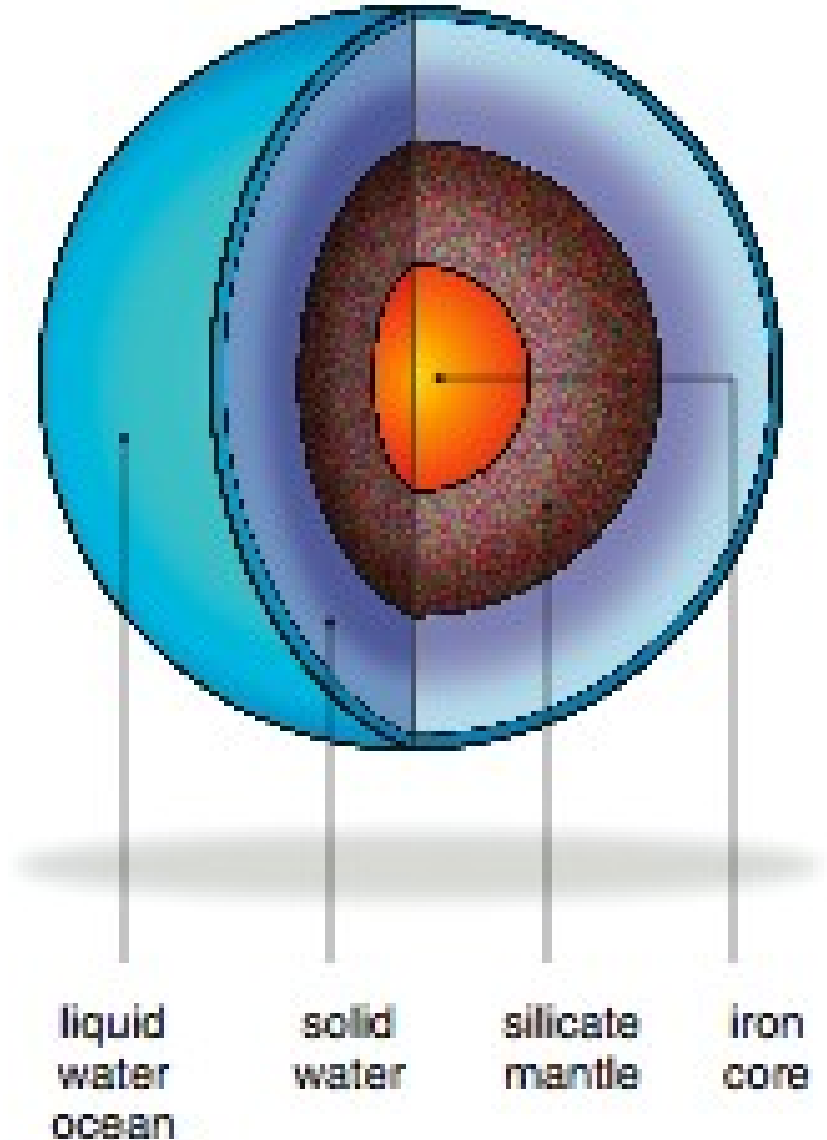
silicate
mantle

iron
core

ocean superEarths



Diana Valencia



Earth's oceans



volume of ocean
1.4 billion km³

Earth's oceans



volume of ocean

1.4 billion km³

= 200,000 m³

for every person on Earth

Earth's oceans



volume of ocean

1.4 billion km³

= 200,000 m³

for every person on Earth

= 80 Olympic swimming pools each


Earth's oceans



volume of ocean

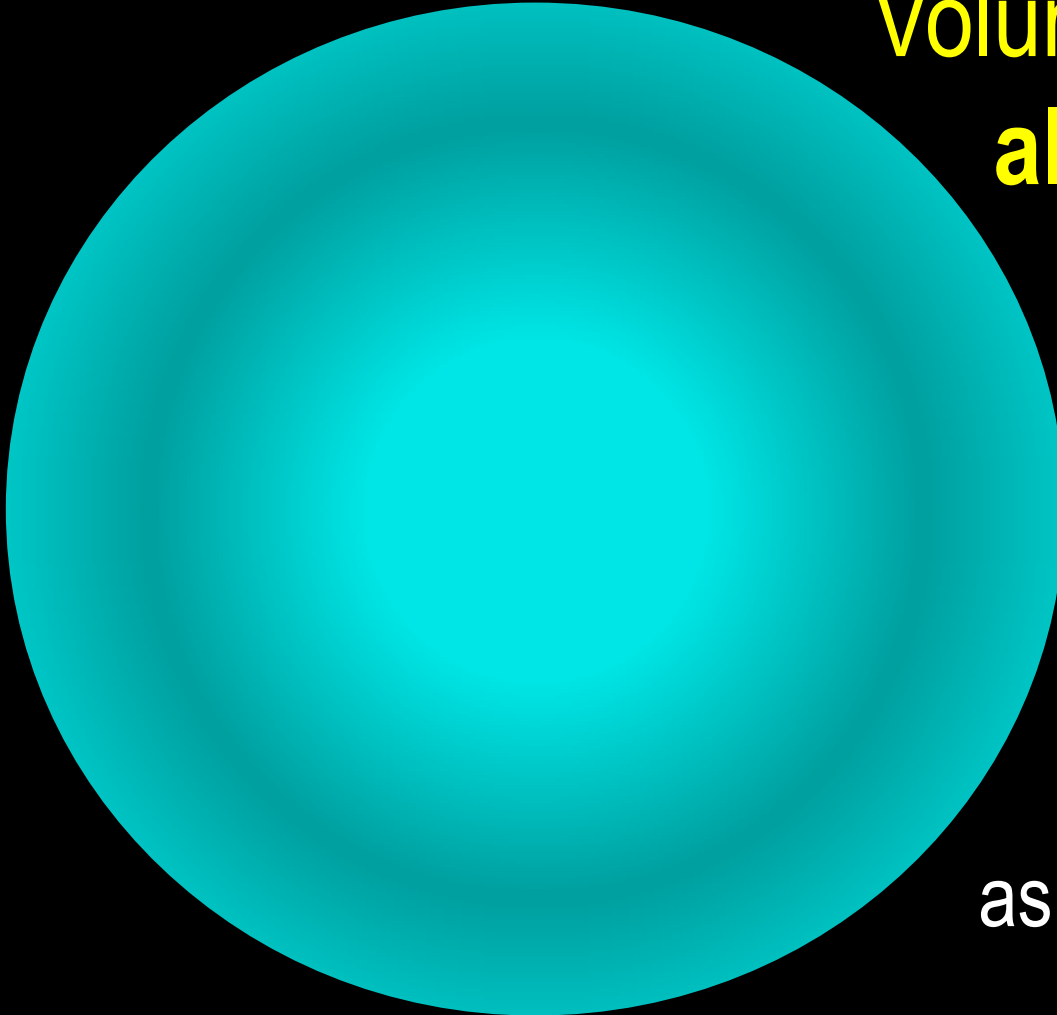
1.4 billion km³

But the amount of drinkable water accessible to human beings on Earth would barely fill one swimming pool

A 3D rendering of Earth showing the continents of Africa, Europe, and Asia. A small, translucent blue and green sphere is placed on the map of Europe, representing the total volume of water on Earth. The sphere is significantly smaller than the Earth, illustrating the relative scarcity of water on the planet.

**Volume of
all the water
on Earth
if you gathered
it into one ball**

This includes the water
in the oceans, ice caps,
lakes and rivers, in the
ground and the atmosphere



**Volume of
all the water
on a superEarth
if you gathered
it into one ball**

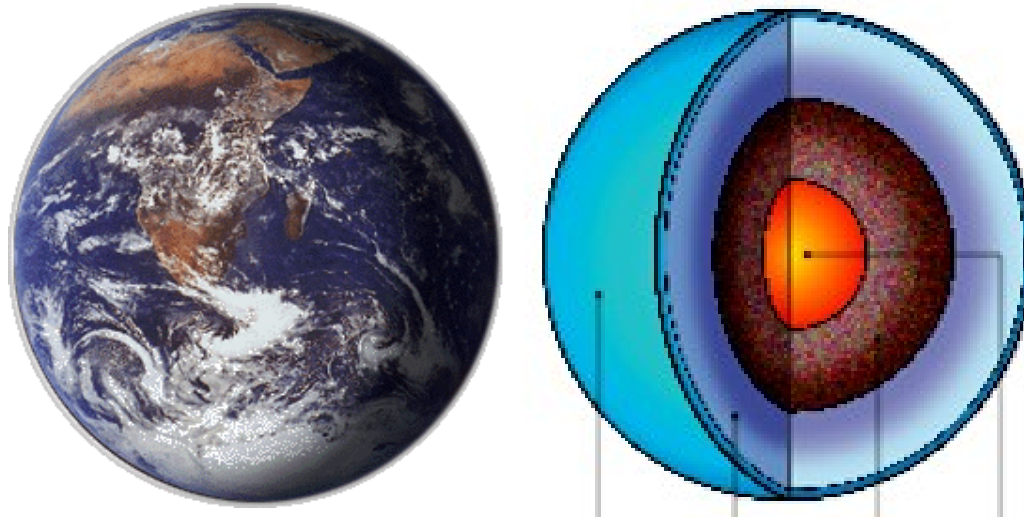
It would be
the same volume
as our entire planet!

Earth



volume of ocean
1.4 billion km³

Earth vs. an aqua-superEarth

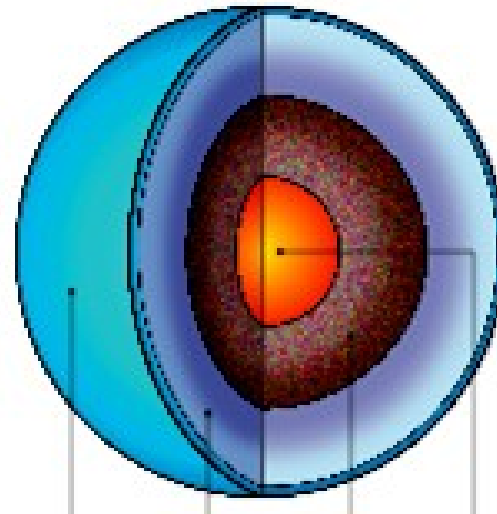


volume of ocean

1.4 billion km³

1000 billion km³

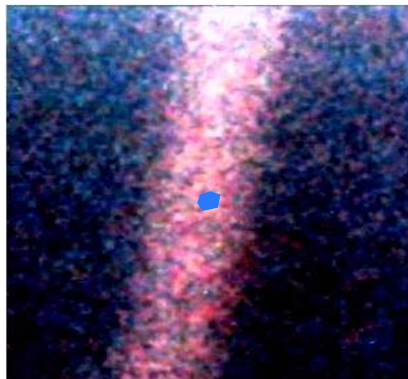
Earth vs. an aqua-superEarth



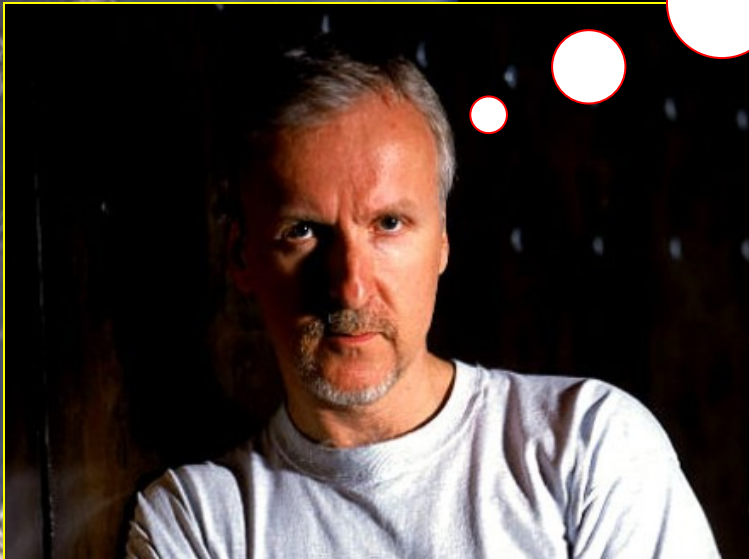
volume of ocean

1.4 billion km³

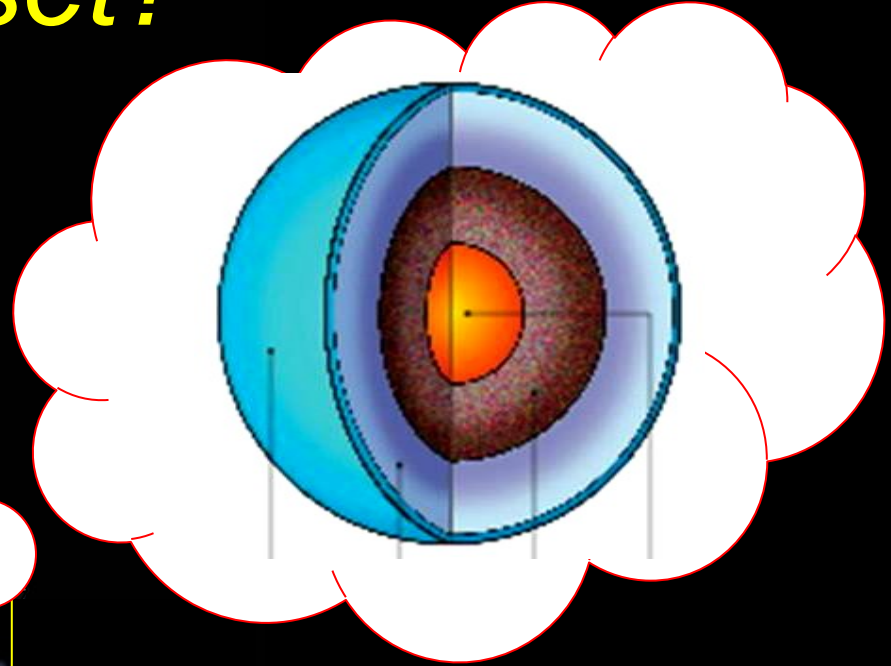
1000 billion km³



*Where will Avatar 2
be set?*

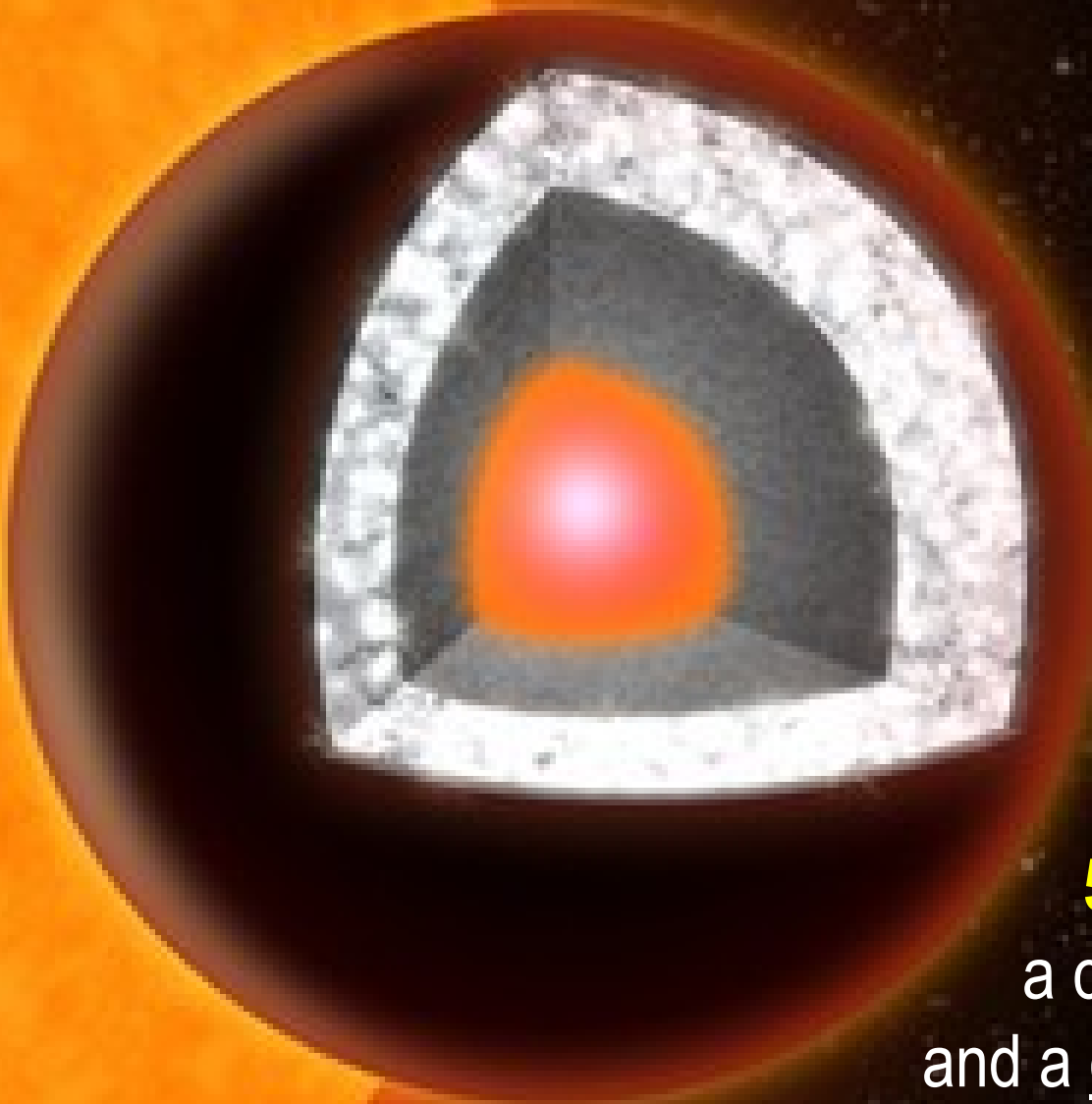


Where will Avatar 2 be set?



James Cameron
is filming his Avatar
sequel, which is set on
an ocean superEarth

www.space.com/18011-super-earth-planet-diamond-world.html

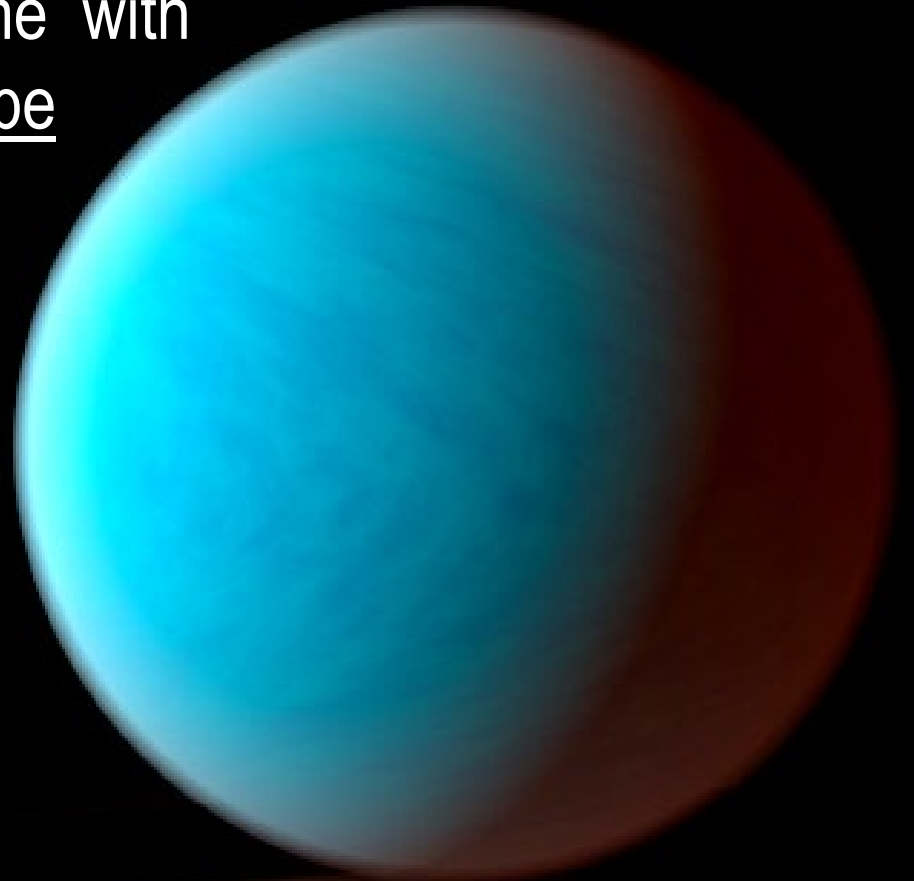


A team of Yale theoreticians announced yesterday that the exoplanet **55 Cancri e** may have a carbon-rich interior and a diamond core

www.space.com/18011-super-earth-planet-diamond-world.html

The planet, orbiting a Sun-like star 40 light years (30 pc) away is a **superEarth**, about twice the radius and 10× the mass of Earth

The true orbit and physical nature of **55 Cancri e** were discovered for the first time with Canada's MOST space telescope last year by my team, students and partners at MIT, Harvard and UC Santa Cruz



Flying saucers in the movies

MARS ATTACKS!



Flying saucers in the movies

MARS ATTACKS!



Flying saucers in the movies



Flying saucers and the Nazis?

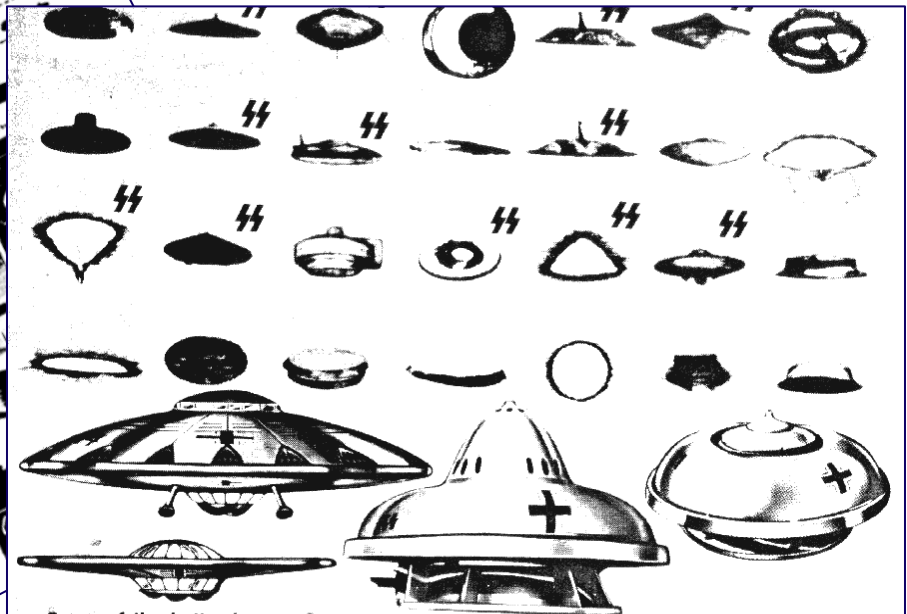


Junk mail from "Samisdat Press"
 I got when I was in high school
 Catalogs with 'evidence' that
 UFOs are actually examples
 of Nazi aircraft technology

WHAT'S NEW AT SAMISDAT?

Sensational Revelation: U.F.O.'s are real, they exist!
 Detailed proof with evidence of actual rooms to search...
 Read now the Nazis sent a top secret weapon to America before the war...
 Over 600 pages...
 Part of the extraordinary...

U.F.O.s - NAZI SECRET WEAPON?
 This sensational underground best-seller is now in its 5th edition in English...
 As the center of controversy...
 This book is a...
 Fascinating...
 The Flying Saucers...
 This book is a...
 Fascinating...
 The Flying Saucers...
 This book is a...
 Fascinating...
 The Flying Saucers...



Some of the better known German U.F.O. prototypes.

When spotting a U.F.O. note: date, time, direction of travel or location, speed, angle, shape, size, distance, construction and propulsion of craft.
 Compare to shape on spotter chart. Describe details. Include photo or drawings and send copies to: Your local F.B.I. office;
 Center for U.F.O. Studies, Allen Hynek, Director, P.O. Box 11, Northfield, Ill. 60093 U.S.A.; Flying Saucers, Palmer Publications, Amherst, Wisc. 54406, U.S.A.; Samisdat Publishers, 206 Carlton St., Toronto, Canada.

If you want to be on our mailing list for future books, please drop us a line: Samisdat Publishers 206 Carlton St. East Toronto Canada

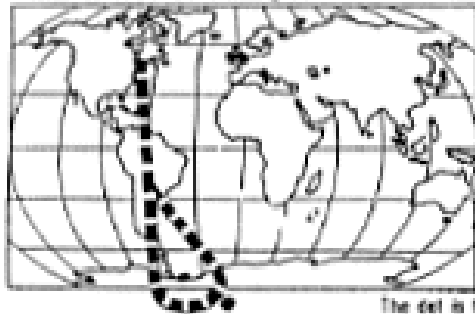
TELEPHONE (416) 922-9850

ACHTUNG! SAMISDAT NEWS BULLETIN

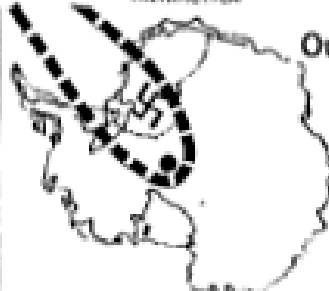
SAMISDAT HOLLOW EARTH EXPEDITION **\$9999.00** IN SEARCH OF HOLES IN THE POLES



Flight path of proposed 1979-1980 Antarctic Expedition.



The dot is the South Pole



ANTARCTICA



Our Model No. 1 in flight, called "Flügelrad" by the Nazis.



Specially-designed "Samisdat-Saucer" Frisbee based on Nazi German Flying Disc designs.



SEARCH FOR HITLER'S ANTARCTIC U.F.O. BASES

Due to an overwhelming number of letters and telephone calls requesting details about our new books, new products, speaking tours, psychic research projects and our intensive experimental UFO-construction programs, we have to use this less personal form of keeping in touch with our many friends and collaborators around the world.

For the low, low price of only **\$9,999.00** (not **\$9,999.99**) you got a seat on a 747 to find the hole in the South Pole that's a door to the secret Nazi UFO base in the hollow Earth

If you do not fill out the attached form and return it to us with a token of support--whatever you can afford--this will be our last communication to you. I am sorry that we will not be able to send you further bulletins concerning the progress of our UFO research and development program in Germany and North America. Nor will you ever know when the Antarctic Expedition takes off, nor what we have seen and discovered. Too bad.

But for you, the active Samisdat Supporter, who continue to show interest, loyalty and diligence, I extend my most hearty greeting and sincerest gratitude. Welcome aboard the Adventure of a Lifetime!

INNER CIRCLE

Yours truly

Aristof Friedrich



Samisdat Supporter and Financial Contributor:
Please cut out and return this card, properly filled out and completed, in order to qualify as an active Samisdat Supporter.

Samisdat Publ.
206 Carlton St., Toronto, Ont., Canada M5A 2L1

I enclose a donation of \$ _____ in order to receive subsequent issues of The Samisdat Insiders' Report. Please keep me up to date on Samisdat Activities.

Name _____

Address _____

I enclose a donation of \$ _____ toward SAMPROJ R-1 for research & development of flying disc aircraft. When model kits are available, please notify me.

Age: - Sex: - Ethnic Origin: -
Marital Status: - Religious Denomination: -
Education: -
Trade or Profession: -
Hobbies: -
Children: - Number: - Age: - Sex: -
Citizenship Status: -
Political Party membership, if any: -
Please enclose a recent photograph.

I enclose \$ _____ for: SAMISDAT SAUCER-FRISBEE _____
Type Qty
SAMISDAT MODEL I _____

I would like to take part in SAMISDAT's proposed UFO CONVENTION in South America. I understand that the costs could be as high as \$2500.00 for transportation & accommodation. Yes No



The President of the company was "Aristof Friedrich" which I later discovered was a pseudonym for someone else

If you do not fill out the attached form and return it to us with a token of support--whatever you can afford--this will be our last communication to you. I am sorry that we will not be able to send you further bulletins concerning the progress of our UFO research and development program in Germany and North America. Nor will you ever know when the Antarctic Expedition takes off, nor what we have seen and discovered. Too bad.

But for you, the active Samiadat Supporter, who continues to show interest, loyalty and diligence, I extend my most hearty greeting and sincerest gratitude. Welcome aboard the Adventure of a Lifetime!

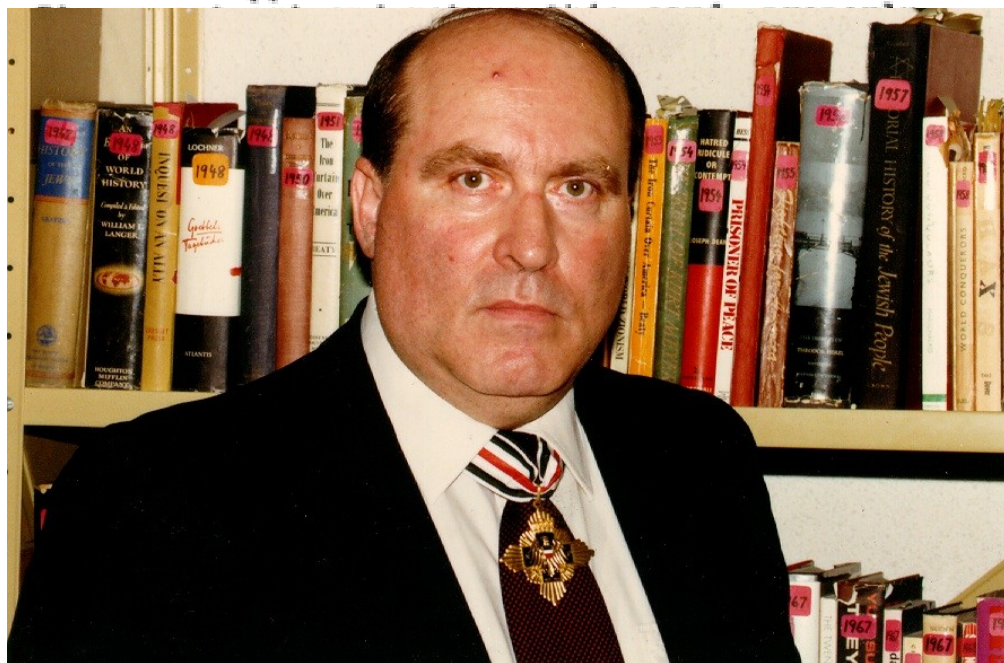
INNER CIRCLE

Yours truly,

Christof Friedrich

Samiadat Supporter and Financial Contributor:

206 Carlton St., Toronto, Ont., Canada M5A 2L1



Name _____
Address _____
Age: - Sex: - Ethnic Origin: -
Marital Status: - Religious Denomination: -
Education: -
Trade or Profession: -
Hobbies: -
Children: - Number: - Age: - Sex: -
Citizenship Status: -
Political Party membership, if any: -
Please enclose a recent photograph.



a neo-Nazi Holocaust denier who was later extradited from Canada

Ernst Zundl

Cloak and dagger

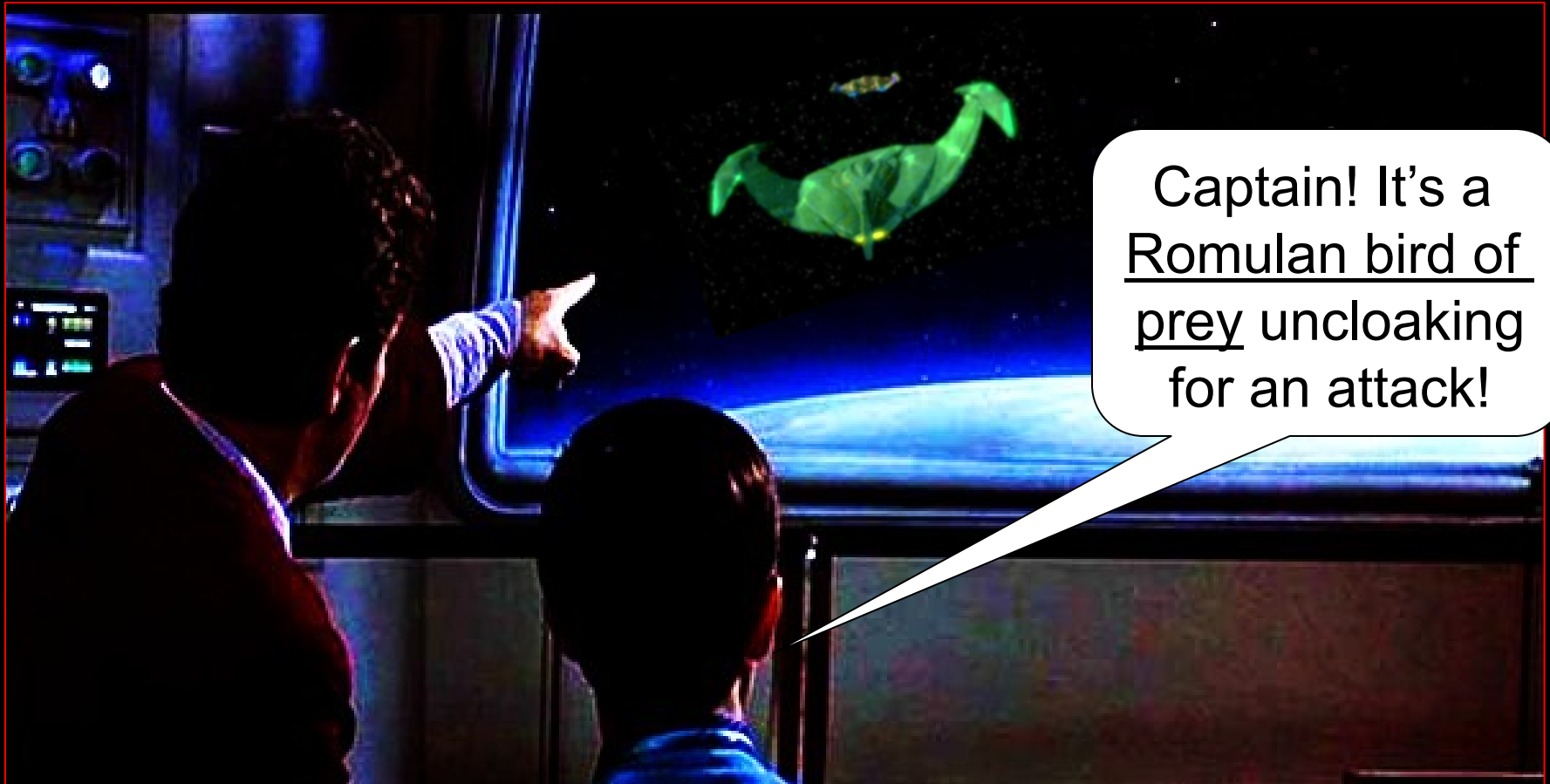


Cloaks



Captain Kirk spots something
in front of the Enterprise

Cloaks and Romulans



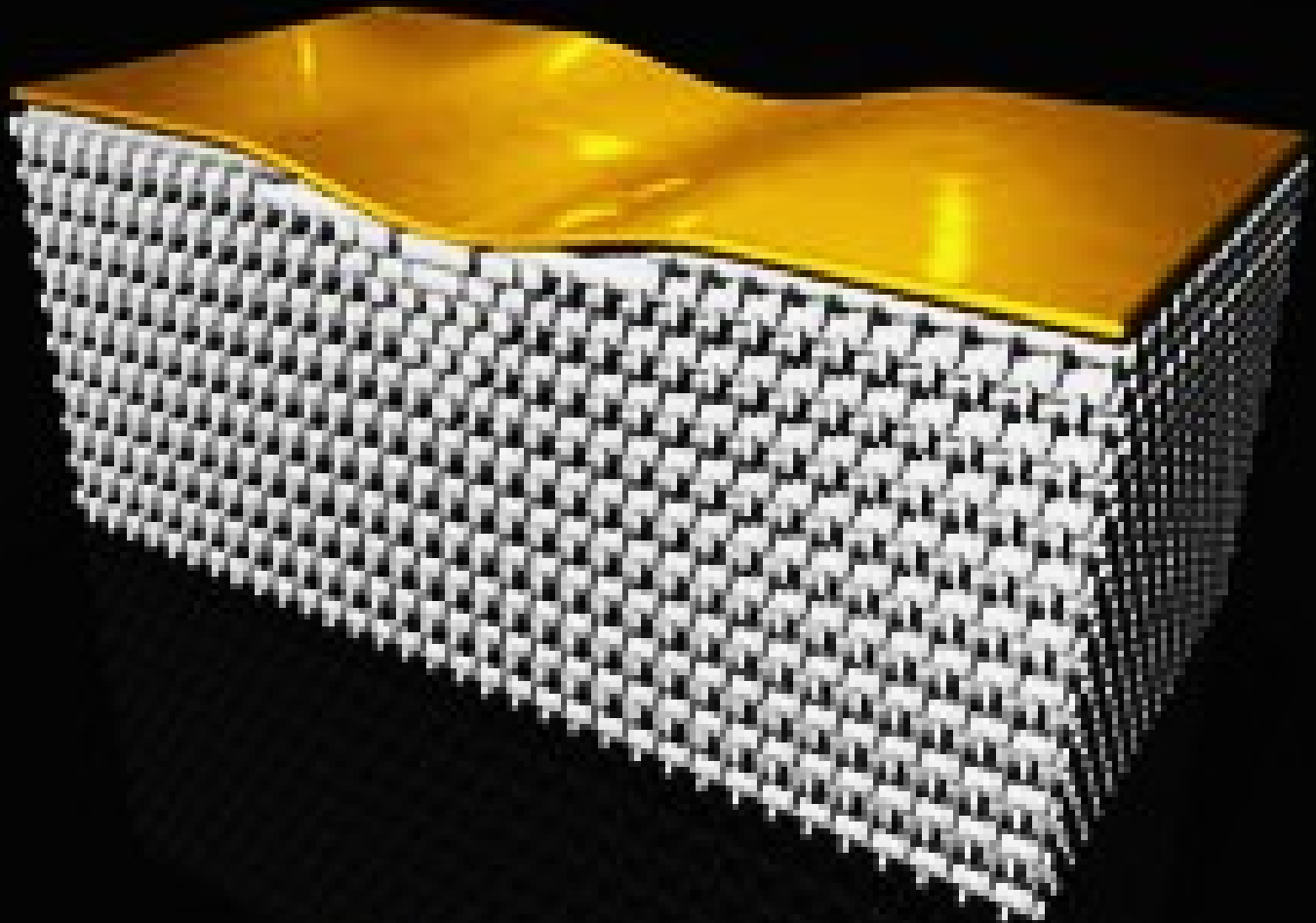
Captain Kirk spots something
in front of the Enterprise

Cloaks and Romulans



Cloaks and Germans

This is a working cloaking device



Cloaks and German scientists

This is a working cloaking device from a team at the Karlsruhe Institute of Technology



led by
Tolga Ergin

Cloaks and crystals

A computer generated view of the “cloak”
– a lattice of rod-like polymer crystals with air spaces



The effective
refractive indices
change the paths of light
to obscure a bump on a surface

Cloaks and Goldfinger?

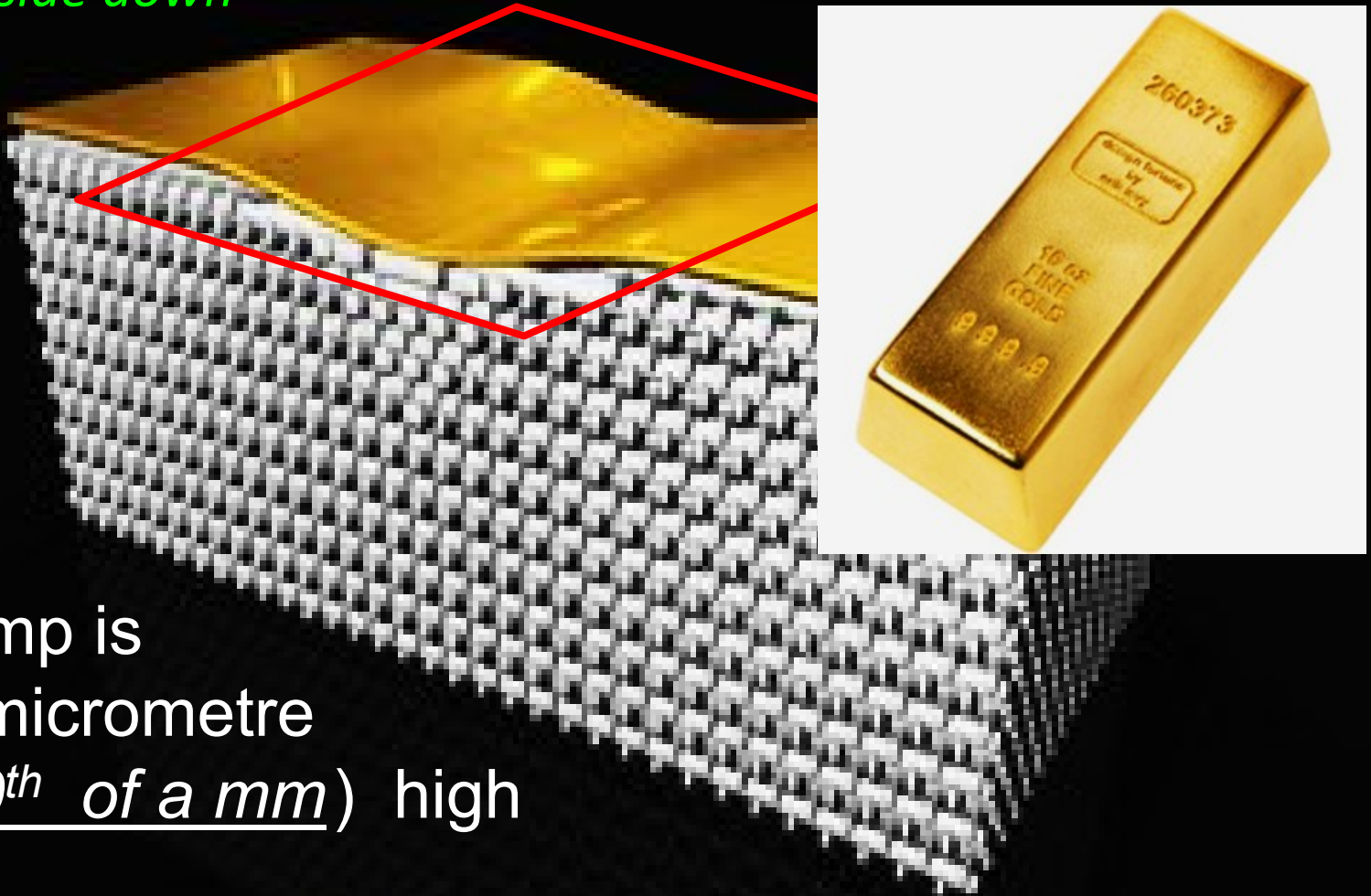
The bump is on a bar of gold



Cloaks and Golddimple?

*surface bump
shown upside down*

The bump is on a bar of gold



The bump is
only 1 micrometre
($1/1000^{th}$ of a mm) high

Cloaks

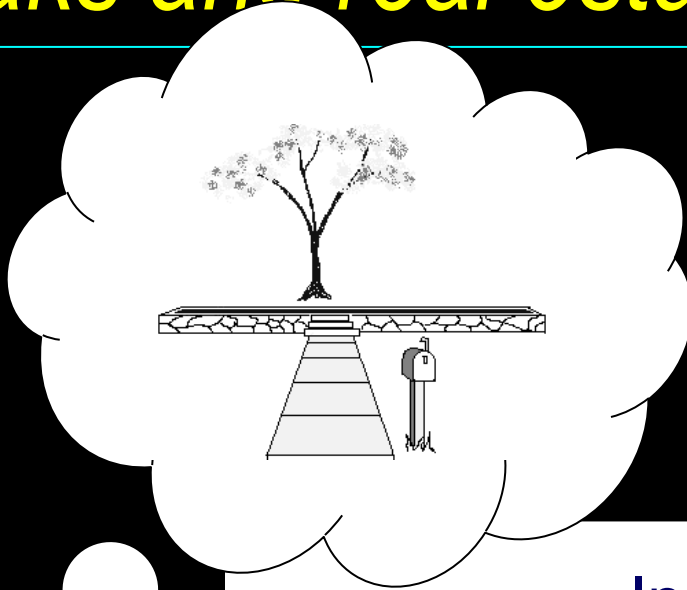
“By changing the thickness of the rods, you can change the ratio of air to polymer. Since the refractive index of air is about one and the refractive index of the polymer is about 1.52 ... we can get any refractive index between those two numbers.

In principle, the cloak design is completely scalable; there is no limit to it.”



Tolga Ergin

Cloaks and real estate fraud?



In principle, the cloak design is completely scalable; there is no limit to it.”

You could blow this up and hide a house.



Tolga Ergin

Cloaks and The Wrath of Khan?



Captain Kirk spots something
in front of the Enterprise

Cloaks and The Wrath of Khando



which could be the start
of a whole new movie

Cloak and dagger



A night in a spooky cemetery



A night in a spooky cemetery

trails of ghostly energy



A night with ghosts?

trails of ghostly energy



A day with Costa Rican teachers

trails of ghostly energy

are twirling strings
of Christmas lights



A day with Costa Rican teachers

Three years ago, *CIENTEC* – Costa Rica's nonprofit science education & outreach agency – hosted a conference for Latin American science teachers



A day with a walking tree (?!?)

Some of the teachers and I spent the day in the Tirimbina Nature Preserve where we saw a walking tree whose roots supposed grow and die so that the tree very slowly “walks” toward the most light in the forest canopy



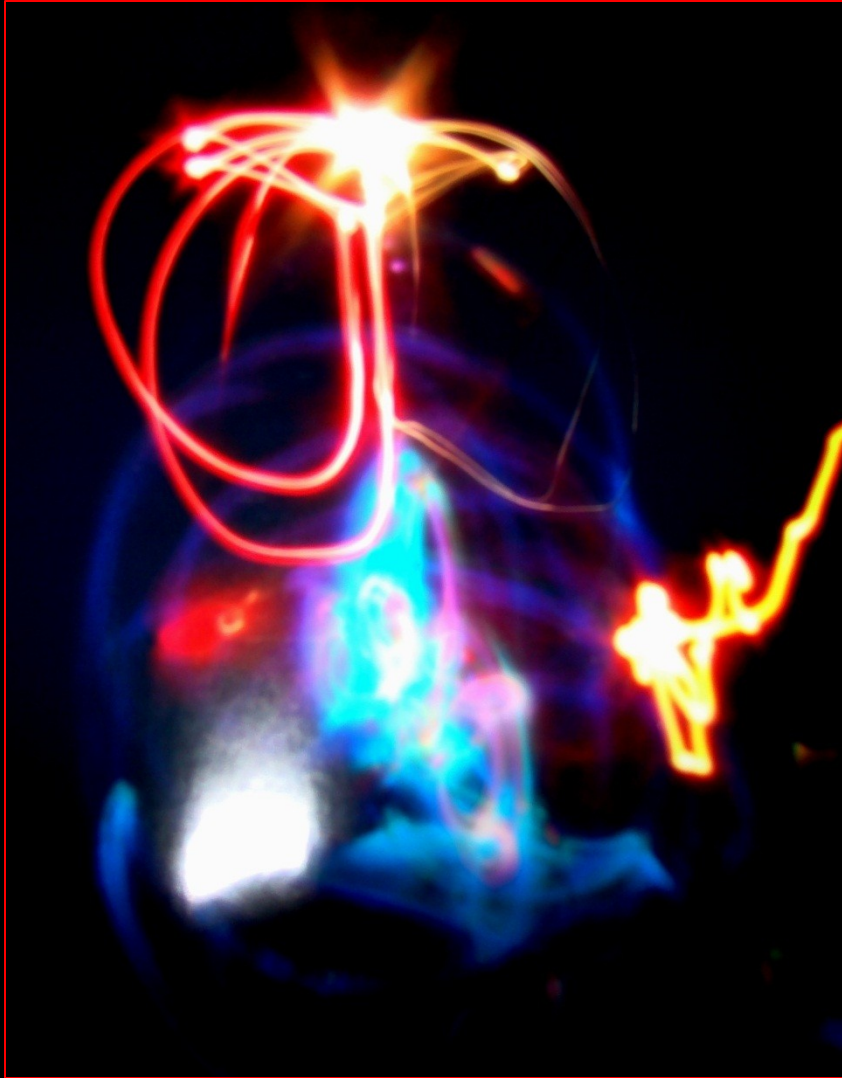
*The magazine **The Skeptical Inquirer** (Vol. 33.6, Nov / Dec 2009) contains an article “The Myth of the Walking Tree” by Ben Radford which debunks this ~~urban~~ myth*

A day with Costa Rican teachers

One of the teacher workshops was "Painting With Light" taught by an educator from San Francisco's *Exploratorium* using strings of light bulbs



A day with Costa Rican teachers



A close encounter with an ET?

trails of ghostly energy



or *A close encounter with an LED*?

teachers with a skipping rope



Strange evidence of the paranormal

Mulder's office



X Files



**I WANT TO
BELIEVE**

Normal evidence of fun with physics

teachers' light paintings



X-mas lights





Jaymie entertaining Austrian astronomers & students one night last June on the shores of Lake Balaton in southern Hungary with his twirling LED extravaganza



Satire and science, hoaxes and history

Let me tell you a tale of attempted scientific satire that unintentionally became accepted truth by many

in a case of “I guess you had to be there” to truly understand the unintentional joke

I’ll start with a historic piece of social satire

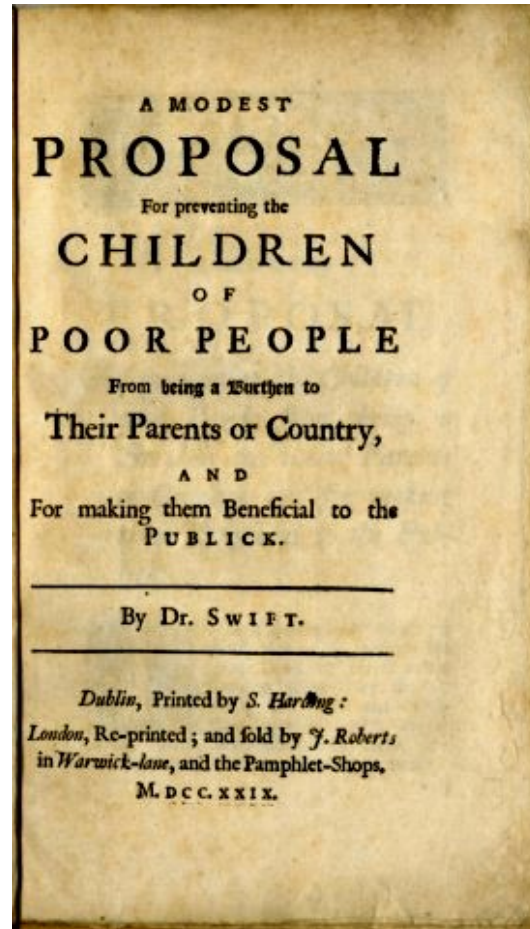
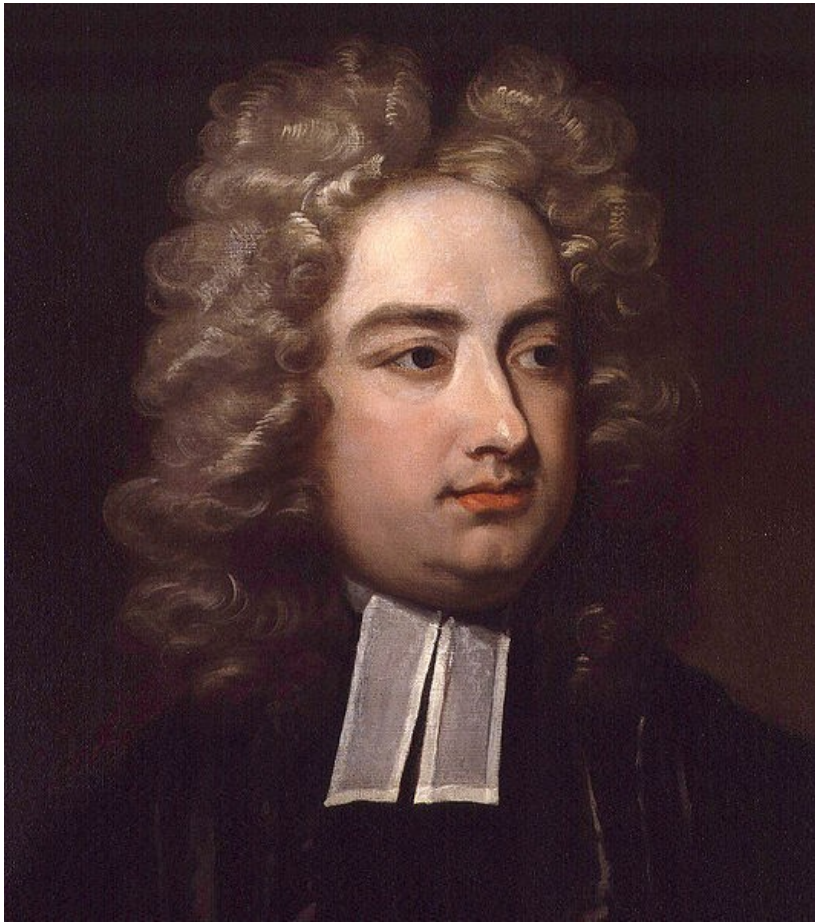


*For a more recent deliberate hoax, check out this news story:
www.kpbs.org/news/2012/aug/06/hoaxes-and-art-what-crosses-line-legally/*



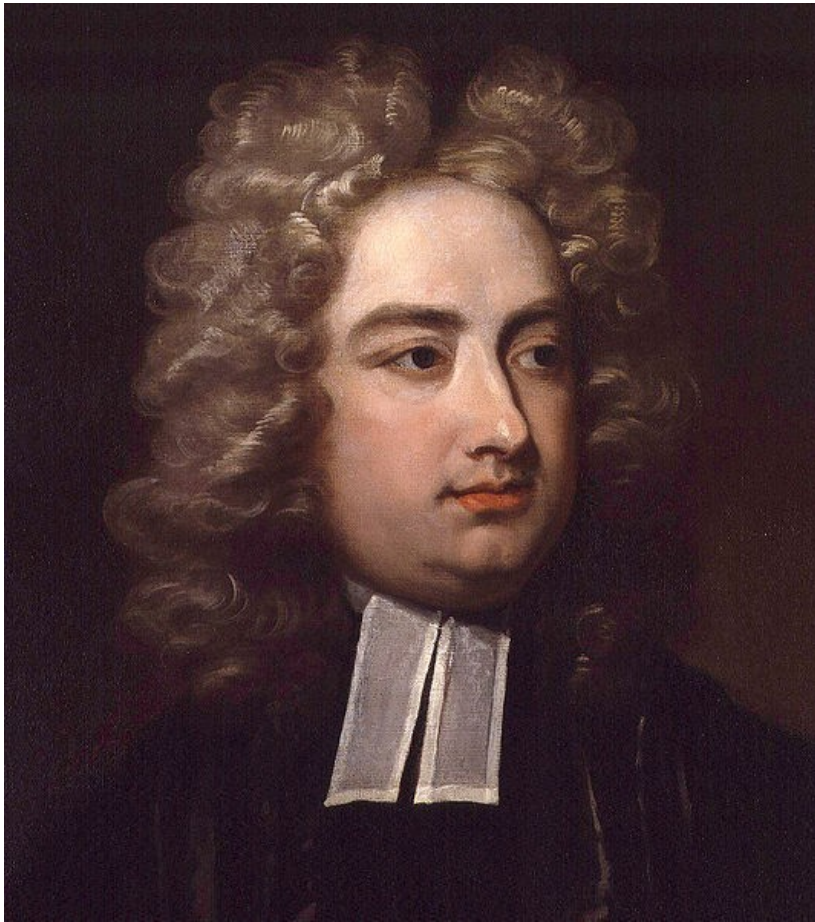
Jonathan Swift

1667 – 1745

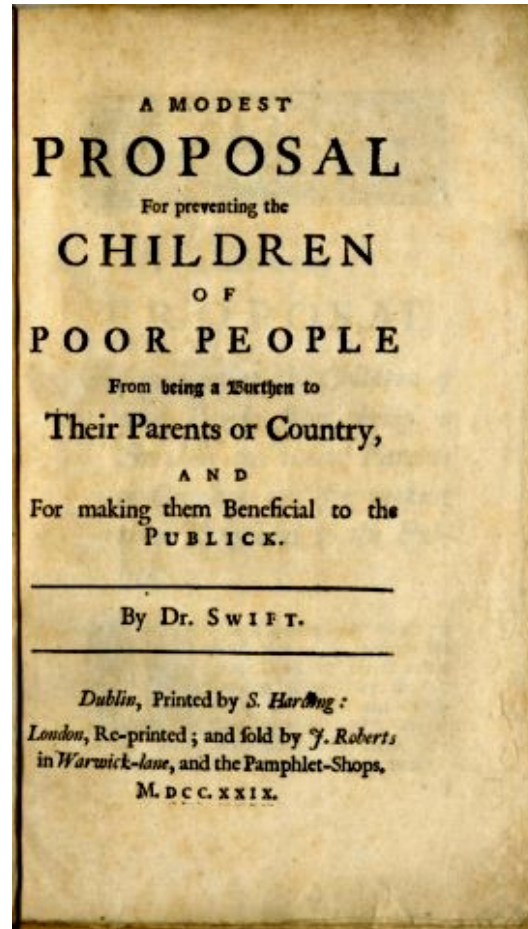


Jonathan Swift
1667 – 1745

A Modest Proposal
1729



Jonathan Swift
1667 – 1745



A Modest Proposal
for preventing the children of poor
people from being a burden to their
parents or country ...



Swift's satirical solution to help the impoverished Irish people:

They could sell their children as food for the rich

A Modest Proposal
for preventing the children of poor people from being a burden to their parents or country ...

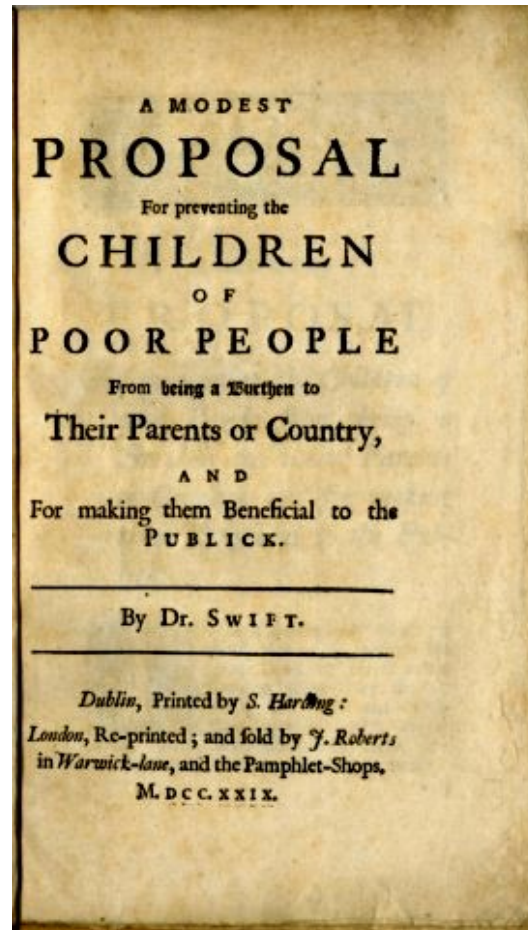
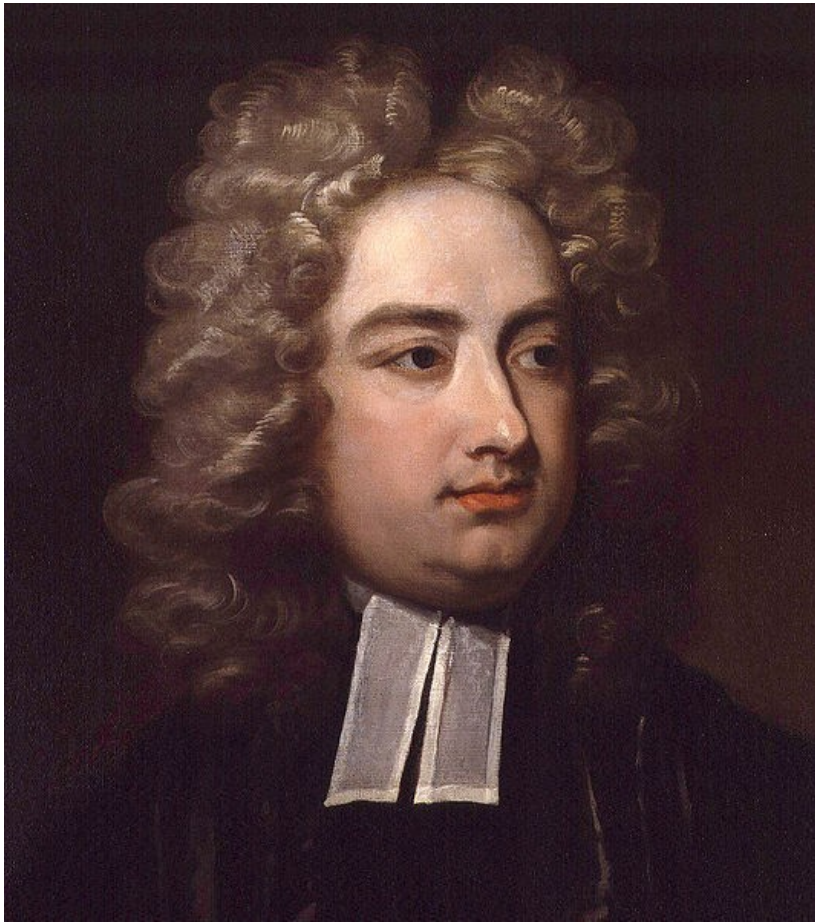
Swift's satirical solution to help the impoverished Irish people:

They could sell their children as food for the rich

“I have been assured by a knowing American of my acquaintance, that a young healthy child, well nursed, is at a year old a most delicious, nourishing wholesome food, whether stewed, roasted, baked, or boiled ...”

A Modest Proposal
for preventing the children of poor people from being a burden to their parents or country ...





Jonathan Swift A Modest Proposal
1667 – 1745 1729



Richard A. Locke
1800 – 1871

**GREAT ASTRONOMICAL DISCOVERIES,
LATELY MADE
BY SIR JOHN HERSCHEL, L.L.D. F.R.S. &c.
At the Cape of Good Hope.**
[From Supplement to the Edinburgh Journal of Science.]
In this unusual addition to our Journal, we have the happiness of making known to the British public, and thence to the whole civilized world, recent discoveries in Astronomy which will build an imperishable monument to the age in which we live, and confer upon the present generation of the human race proud distinction through all future time. It has been poetically said that the stars of heaven are the hereditary regalia of man as the intellectual sovereign of the animal creation. He may now fold the Zodiac around him with a loftier consciousness of his mental supremacy.
It is impossible to contemplate any great Astronomical discovery without feelings closely allied to a sensation of awe, and nearly a kin to those with which a departed spirit may be supposed to discover the unknown realities of a future state. irrevocable laws of nature to the globe live; creatures, "close shut up in infidelity," it seems like acquiring a fearful super-when any of the remote and mysterious works of the Creator yield tribute to our curiosity. It seems a-

1835

Great Astronomical
Discoveries Lately
Made By J. Herschel

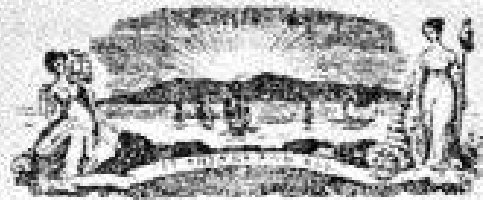


Richard A. Locke
1800 – 1871

Locke was born in England to a rich family. It was expected that Locke should attend Oxford or Cambridge and then manage the family estate. But at a young age Locke adopted radical Republican political views which prompted his father to disown his son.

Locke became a writer. Finding it difficult to find work because of his political views, in 1831, Locke moved his family to America, where started writing for the new New York Sun newspaper.

T H E



S U N .

NUMBER 615.]

NEW YORK, TUESDAY MORNING, AUGUST 25, 1835.

[PRICE ONE CENT.]

PUBLISHED DAILY, BY DRUGGIST, 12, N. Y. ST. N. Y.

Office, at the corner of Nassau and Spruce streets.
Opposite City Hall.

TERMS OF ADVERTISING.

1 square 1 week, \$10 00	1 square 2 weeks, \$18 00
do. 3 weeks, 15 00	do. 1 month, 30 00
do. 1 month, 50 00	do. 3 days, 5 00
do. 1 week, 10 00	do. 1 day, 1 00

Single lines, (10 words) or less, make a square. All

GREAT ASTRONOMICAL DISCOVERIES,
LATEST NEWS.
BY SIR JOHN HERSCHEL, B.A. F.R.S. &c.
As the Origin of Great Events.
[From Supplement to the Edinburgh Journal of Science.]

In this important addition to our Journal, we have the happiness of bringing hereto by the British post, and thence to the whole civilized world, news

to further discovered in our solar system. Several years, however, prior to the death of this venerable astronomer, he conceived it practicable to construct an improved system of parabolic and spherical reflectors which, by uniting all the numerous powers of the Gregorian and Newtonian instruments, with the highly successful astronomical discovery of Dollond, would, to a great degree, remove the formidable ob-

stacles which had hitherto attended the construction of telescopes of great power, and would require an ultra-refined speed of 200 miles an hour, for nearly the last long year, to execute him a more favorable inspection of the great machinery of night. The interesting question, however, whether the light of the western forest, or the fireless planet, and of the deep. How great as it rolls within the object of the lovely career, of the unclouded eye on the famous battle field, and of all the pilgrims of love and hope, of misery and despair, that have

Locke wrote articles in the Sun about life on the Moon as a satire. The object of his satire was the unchecked influence of religion upon science. This influence led to an "imaginative school of philosophy" that substituted airy fancies, pleasing to religion, for hard fact. Such "theological and devotional encroachments upon the legitimate province of science" were evident to him in the works of Thomas Dick, the 'Christian Philosopher' who had calculated the population of the Solar System, and German astronomers who claimed to see signs of life on the moon.

GREAT ASTRONOMICAL DISCOVERIES,

LATELY MADE

BY SIR JOHN HERSCHEL, L.L.D. F.R.S. &c.

At the Cape of Good Hope.

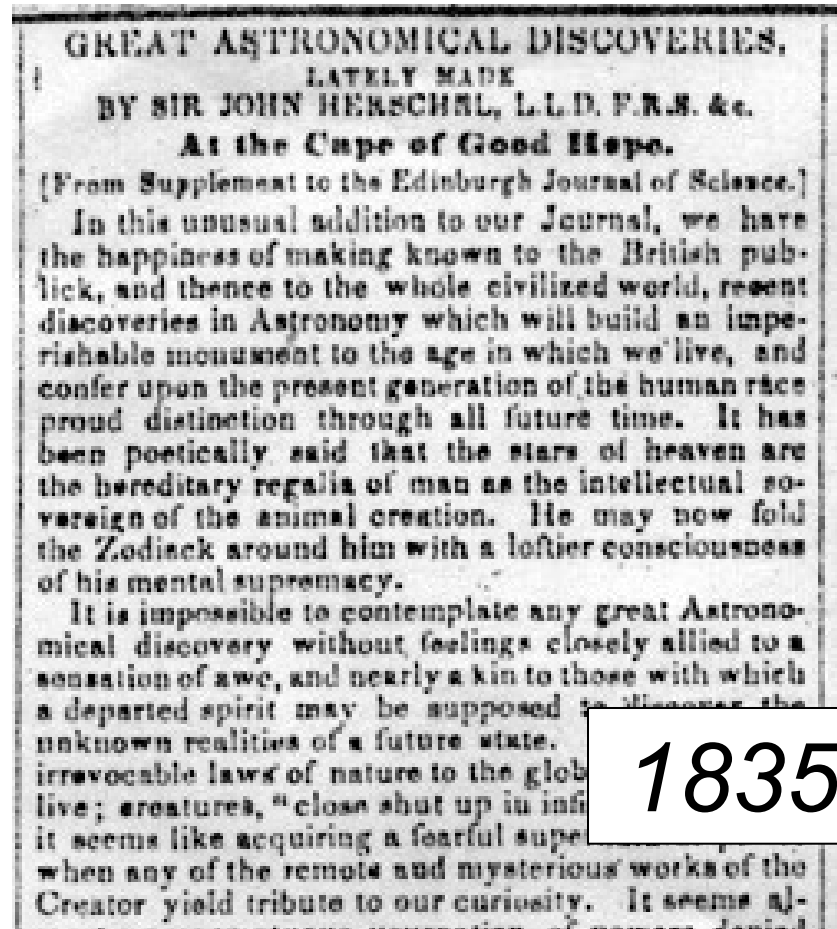
[From Supplement to the Edinburgh Journal of Science.]

In this unusual addition to our Journal, we have the happiness of making known to the British public, and thence to the whole civilized world, recent discoveries in Astronomy which will build an imperishable monument to the age in which we live, and confer upon the present generation of the human race proud distinction through all future time. It has been poetically said that the stars of heaven are the hereditary regalia of man as the intellectual sovereign of the animal creation. He may now fold the Zodiac around him with a loftier consciousness of his mental supremacy.

It is impossible to contemplate any great Astronomical discovery without feelings closely allied to a sensation of awe, and nearly a kin to those with which a departed spirit may be supposed to discover the unknown realities of a future state. Bound by the irrevocable laws of nature to the globe on which we live; creatures, "close shut up in infinite expanse;" it seems like acquiring a fearful supernatural power when any of the remote and mysterious works of the Creator yield tribute to our curiosity. It seems al-



Richard A. Locke
1800 – 1871



Great Astronomical
Discoveries Lately
Made By J. Herschel



Sir John, a noted astronomer and son of the Astronomer Royal, saw fantastic animals on the Moon, including bison, goats, unicorns, bipedal tail-less beavers and man-bats (“Vespertilio-homo”) who had built temples. There are also trees and oceans and beaches.

These discoveries were made with “an immense telescope of an entirely new principle.”

Sir John Herschel
1792 – 1871

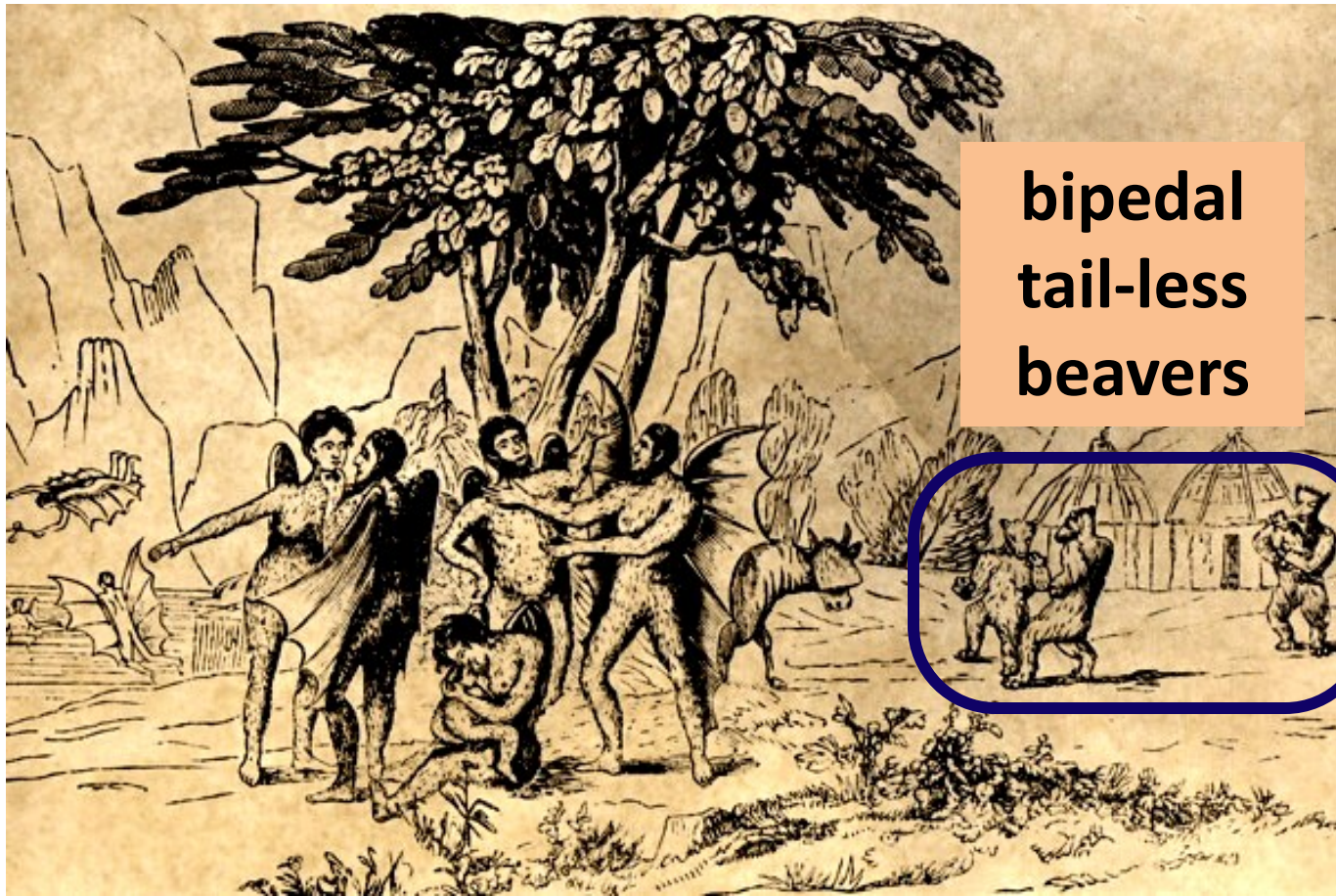
**Great Astronomical
Discoveries Lately
Made By J. Herschel**



surface of the Moon Great Astronomical
today Discoveries Lately
& *for 4 billion years* Made By Astronauts

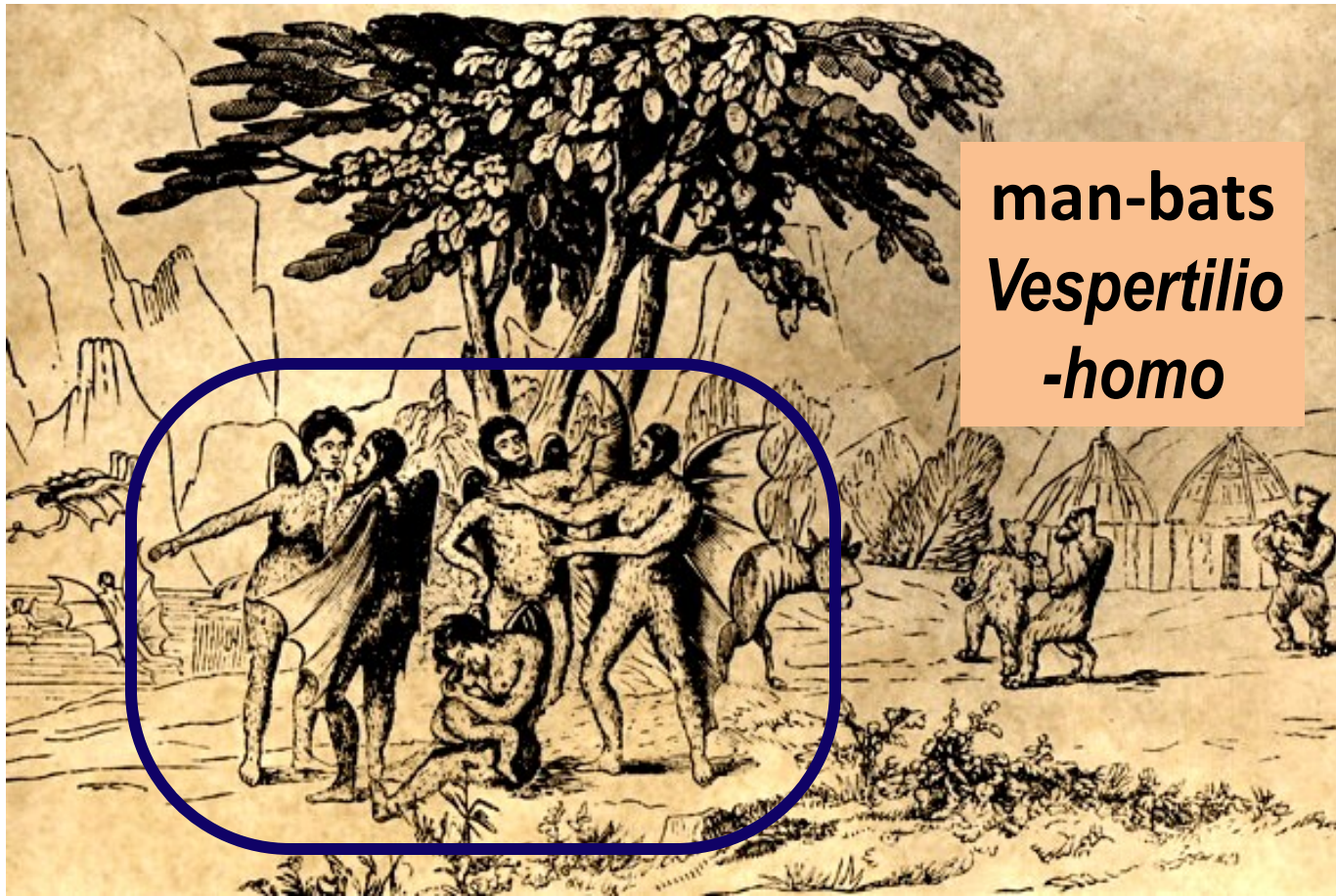


surface of the Moon Great Astronomical
1835 Discoveries Lately
according to Locke Made By J. Herschel



bipedal
tail-less
beavers

surface of the Moon Great Astronomical
1835 Discoveries Lately
according to Locke Made By J. Herschel

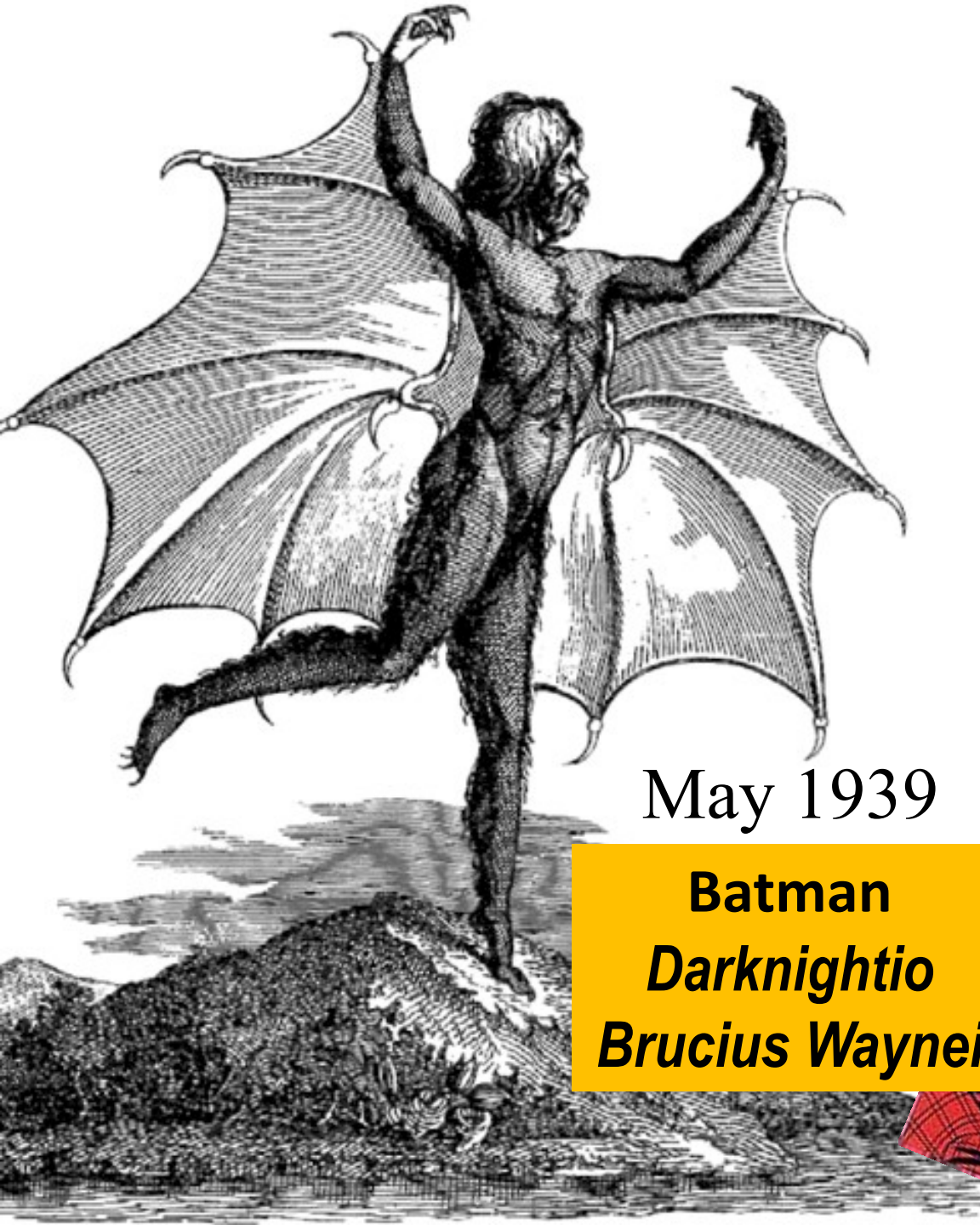


man-bats
Vespertilio
-homo

surface of the Moon Great Astronomical
1835 Discoveries Lately
according to Locke Made By J. Herschel



man-bat
Vespertilio
-homo

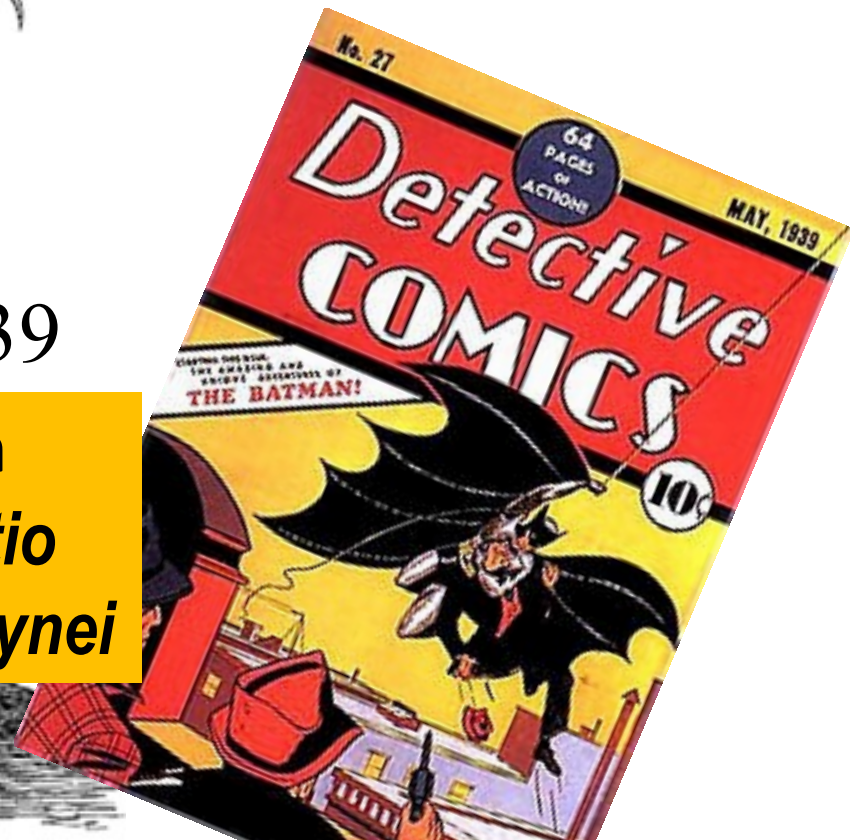


August 1835

man-bat
Vespertilio
-homo

May 1939

Batman
Darknightio
Brucius Waynei





Sir John Herschel.
1792 – 1871.



man-bats
1835



tail-less
beavers
1835



Great Astronomical
Discoveries Lately Made
By Sir John Herschel



REAL!

Sir John Herschel.
1792 – 1871.



NOT!

man-bats
1835

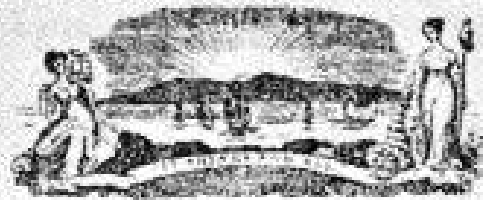
tail-less
beavers
1835



NOT!

Great Astronomical
Discoveries Lately Made
By Sir John Herschel

THE



SUN.

NUMBER 615.

NEW YORK, TUESDAY MORNING, AUGUST 25, 1835.

[PRICE ONE CENT.]

PUBLISHED DAILY, BY DEWEY, 12, N. Y.
 Office, at the corner of Nassau and Spruce streets,
 Opposite City Hall.

TERMS OF ADVERTISING.

1 square 1 week, \$10 00	1 square 2 weeks, \$18 00
do. 2 weeks, 18 00	do. 1 month, 35 00
do. 3 weeks, 25 00	do. 3 days, 5 00
do. 1 month, 50 00	do. 1 day, 25 00

Signs three (3) weeks or less, make a square. All advertisements read for free for 15 CENTS.

CLARENCE DEWEY, No. 12, Nassau, New York.
 GILMAN BECKLEY, the proprietor of the
 printing establishment, would respectfully be-

GREAT ASTRONOMICAL DISCOVERIES,
 LATEST NEWS
 BY SIR JOHN HERSCHEL, B. A. F. R. S. &c.
 An Old Copied of Great Value.

[From Supplement to the Edinburgh Review of 1835.]

In the last number of our Journal, we have
 the happiness of having known by the British pub-
 lick, and thence to the whole civilized world, recent
 discoveries in Astronomy which will build an imper-
 ishable monument to his eye as much as his ear, and
 cause upon the general gaze of the human race
 proud distances through all future time. It has
 been generally said that the stars of heaven are

to be further discovered in our solar system. Several
 years, however, prior to the death of this venerable
 astronomer, he conceived it practicable to construct
 an improved system of portable and spherical reflect-
 ors which, by uniting all the necessary parts in the
 telescope and Newtonian instrument, with the
 highly successful astronomical discovery of Dollond,
 would, to a great degree, remove the formidable ob-
 stacles. His plan caused the most profound re-
 search in optical science, and the most accurate
 inquiry in mechanical construction; but economi-
 cal, military, and eventually death, prevented its
 experimental application. His son, the present Sir
 John Herschel, who had been nursed and trained in

would require an ultra-refined speed of 200 miles
 an hour, for nearly the last long year, to execute his
 most favorable inspection of the great machinery of
 light. The interesting question, however, whether
 sunlight of the western forest, or the fireless planet,
 and of the deep blue ocean as it rolls within the
 object of the lovely current of the unclouded eye on
 the sun-drenched fields, and of all the pilgrims
 of love and hope, of misery and despair, that have
 journeyed over the hills and valleys of this earth,
 through all the wreath of its various history to those
 of its present volume remain; the existing ques-
 tion whether this "observed" of all the stars of men,
 from the dawn of Eden, thence of Babel, to the

Locke's fictional articles were not recognised as satire, but as hoaxes by some members of the media, and as true accounts of reality by a large segment of the Sun's readership. The articles were reprinted in other major American daily newspapers, and translated into other languages and distributed as pamphlets around the world. This angered Locke, but he kept a low profile (having written the articles under a pseudonym), fearing the kind of backlash he had experienced in England for his political views.



Richard A. Locke
1800 – 1871

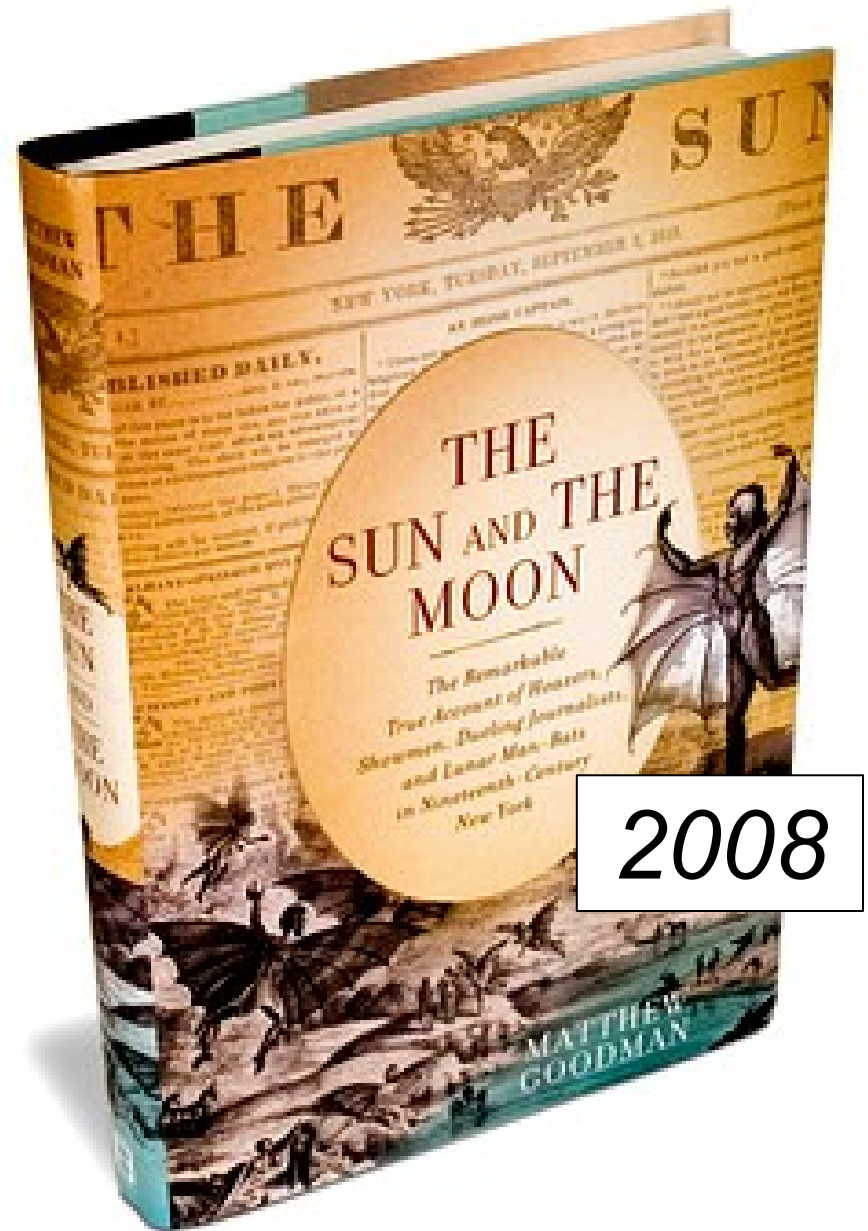
GREAT ASTRONOMICAL DISCOVERIES,
LATELY MADE
BY SIR JOHN HERSCHEL, L.L.D. F.R.S. &c.
At the Cape of Good Hope.
[From Supplement to the Edinburgh Journal of Science.]
In this unusual addition to our Journal, we have the happiness of making known to the British public, and thence to the whole civilized world, recent discoveries in Astronomy which will build an imperishable monument to the age in which we live, and confer upon the present generation of the human race proud distinction through all future time. It has been poetically said that the stars of heaven are the hereditary regalia of man as the intellectual sovereign of the animal creation. He may now fold the Zodiac around him with a loftier consciousness of his mental supremacy.
It is impossible to contemplate any great Astronomical discovery without feelings closely allied to a sensation of awe, and nearly a kin to those with which a departed spirit may be supposed to discover the unknown realities of a future state. Bound by the irrevocable laws of nature to the globe on which we live; creatures, "close shut up in infinity," it seems like acquiring a fearful superfluity when any of the remote and mysterious Creator yield tribute to our curiosity.

1835

Great Astronomical
Discoveries Lately
Made By J. Herschel



Matthew Goodman
*wrote this book
about the Moon Hoax*



2008



You can see and hear a bit more about the Great Moon Hoax from the author of “The Sun and the Moon” in a Canadian documentary

LUNARCY!

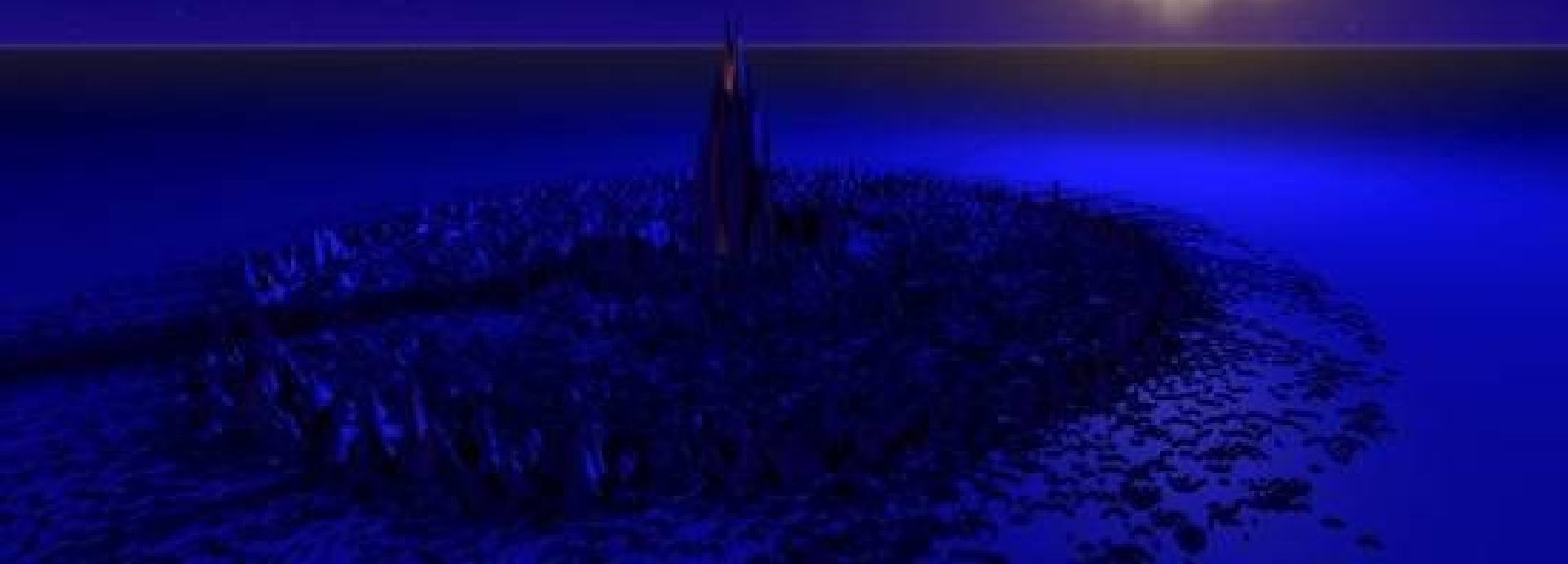
that had its world premiere at the *Toronto International Film Festival* in September and screened at the Vancouver festival last week

I'm in it too

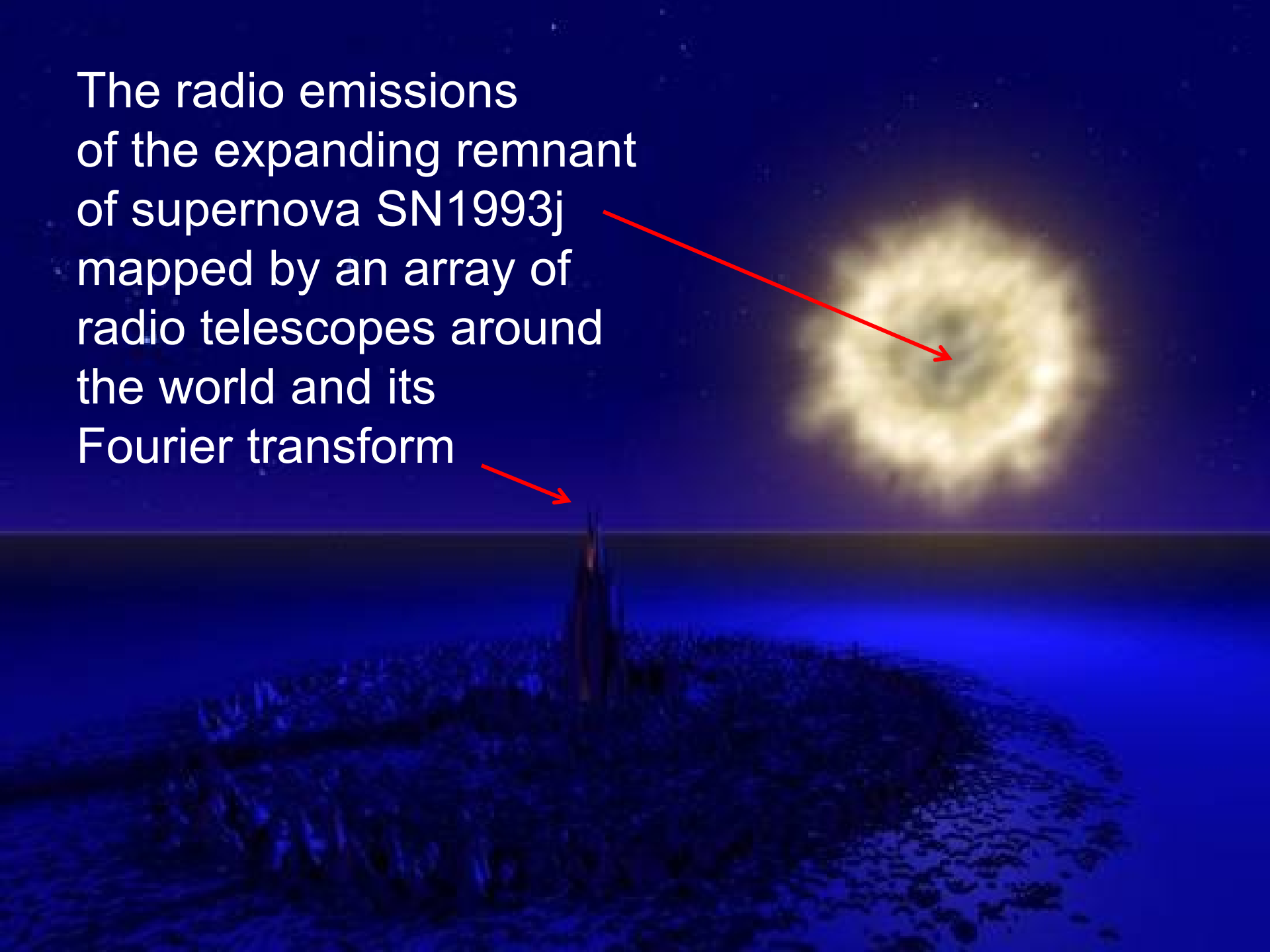
Paranormal
is the old
normal



Normal is
the new
paranormal



The radio emissions
of the expanding remnant
of supernova SN1993j
mapped by an array of
radio telescopes around
the world and its
Fourier transform



Star death

Neutron stars discovered



In 1967, *Jocelyn Bell* (now *Jocelyn Bell-Burnell*) discovered the first neutron star while she was a grad student at Cambridge University

Star death

Neutron stars discovered



In 1967, *Jocelyn Bell* (now *Jocelyn Bell-Burnell*) discovered the first neutron star while she was a grad student at Cambridge University

Jocelyn Bell-Burnell in Prague in 2006 trying to convince astronomers that Pluto should remain a planet



Star death

Neutron stars discovered



In 1967, *Jocelyn Bell* (now *Jocelyn Bell-Burnell*) discovered the first neutron star while she was a grad student at Cambridge University

Jocelyn Bell-Burnell will speak on 26 October at 8:15 am at the Hyatt Regency here in Vancouver



2012
CANADIAN
UNDERGRADUATE
PHYSICS
CONFERENCE

Star death

Neutron stars discovered



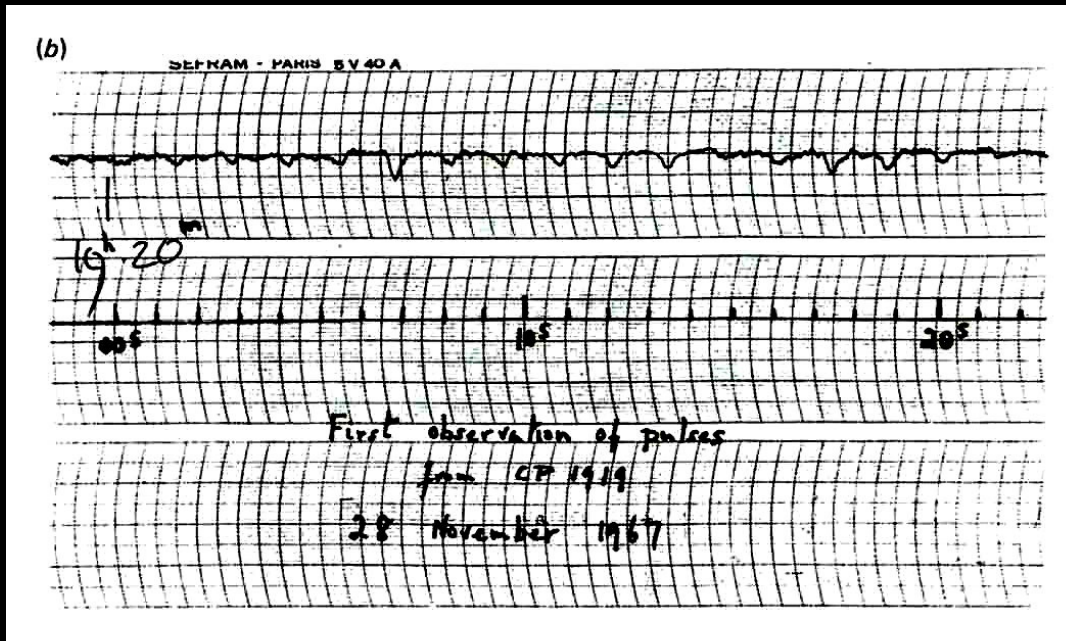
In 1967, *Jocelyn Bell* (now *Jocelyn Bell-Burnell*) discovered the first neutron star while she was a grad student at Cambridge University

She was searching through reams of data from this array of radio antennas as part of an early survey of strong radio sources



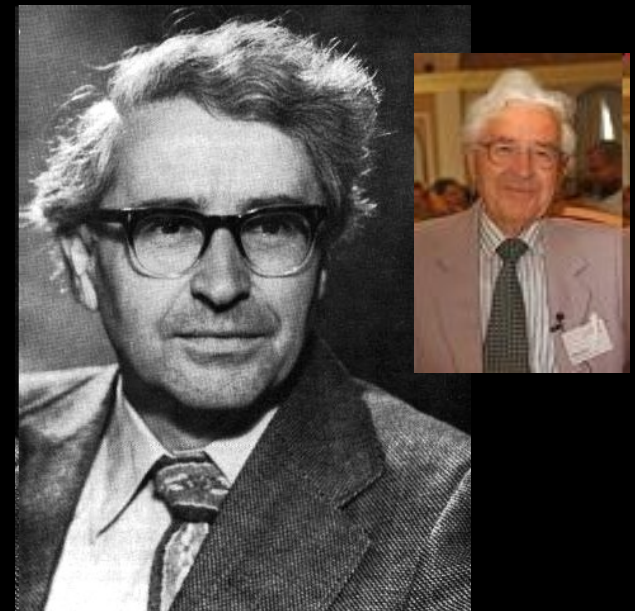
Star death

Neutron stars discovered



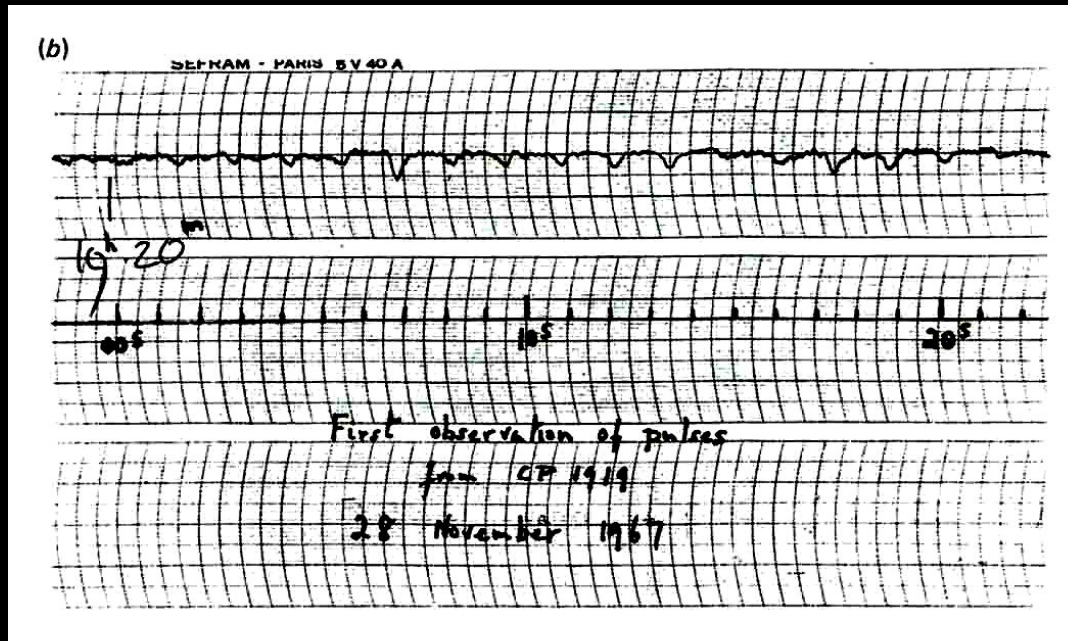
Jocelyn Bell found a source in the sky which emitted radio pulses at a regular rate, like clockwork

She and her graduate research supervisor **Anthony Hewish** were excited and mystified



Star death

Aliens discovered??



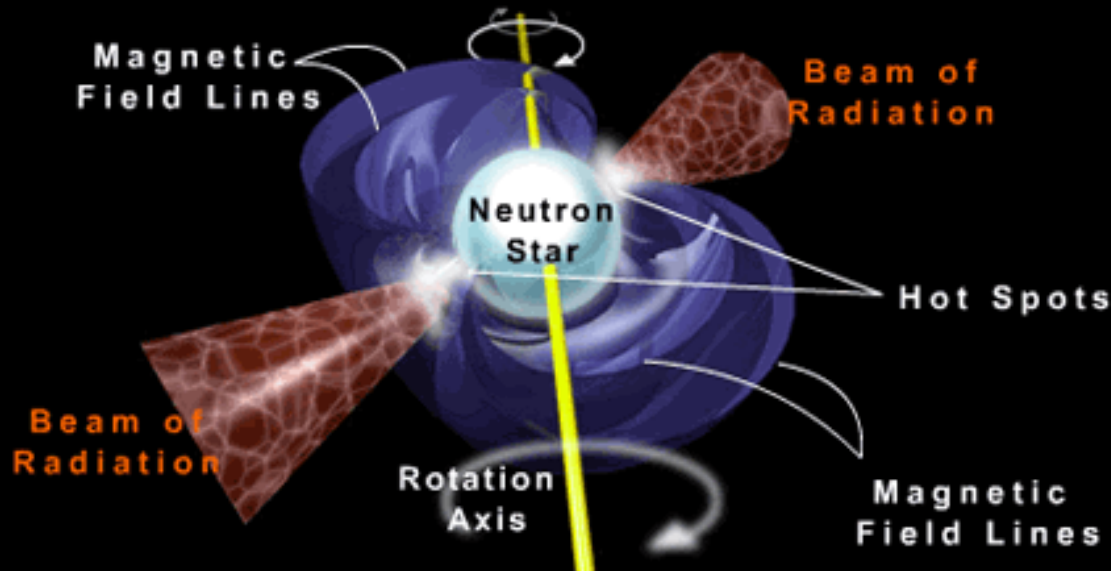
Jocelyn Bell found a source in the sky which emitted radio pulses at a regular rate, like clockwork



In fact, they secretly named this and other pulsing radio sources LGMs for “*Little Green Men*” because this was the kind of signal you might expect from aliens

Star death

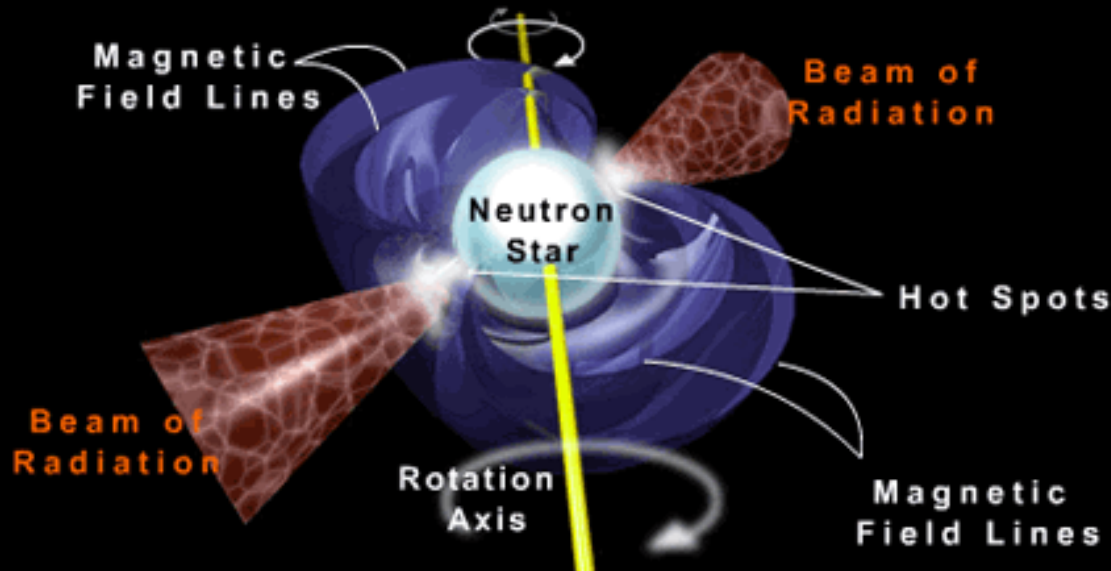
Neutron stars discovered



Hewish, Bell and other astrophysicists soon realised that Bell had found *not* aliens but instead a rapidly rotating neutron star

Star death

Pulsars



Hewish, Bell and other astrophysicists soon realised that Bell had found *not* aliens but instead a rapidly rotating neutron star

These were named pulsars and the first pulsar was catalogued as PSR B1919+21

Star death

Pulsars – radio lighthouses



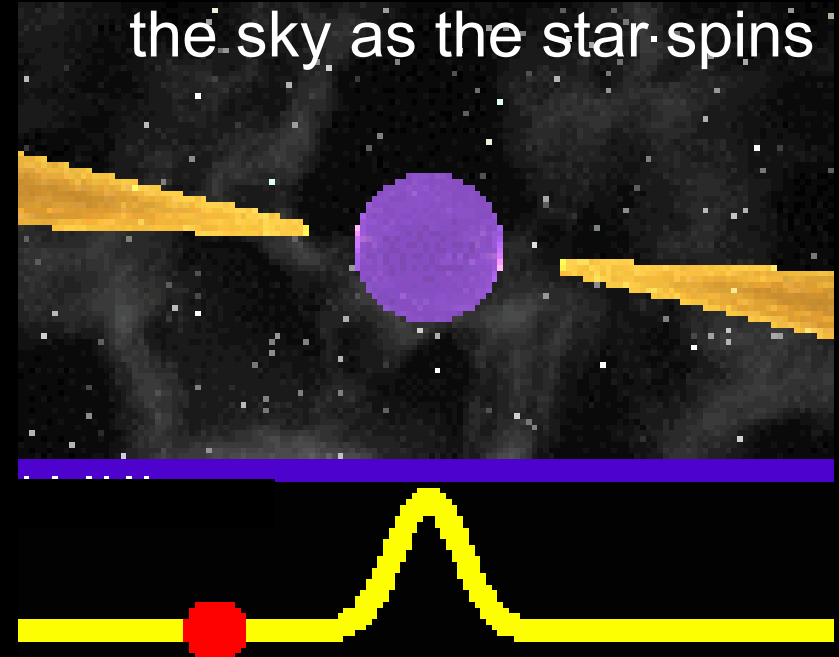
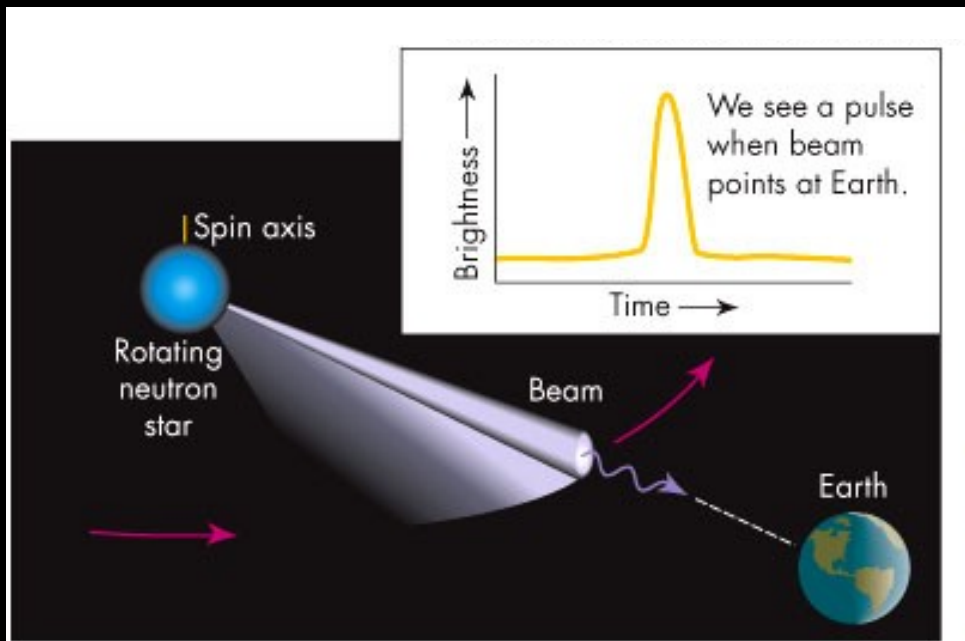
Star death

Pulsars – radio lighthouses

A neutron star has a magnetic axis (dipole) with 'north' and 'south' poles which is tilted relative to the axis of rotation (spin)

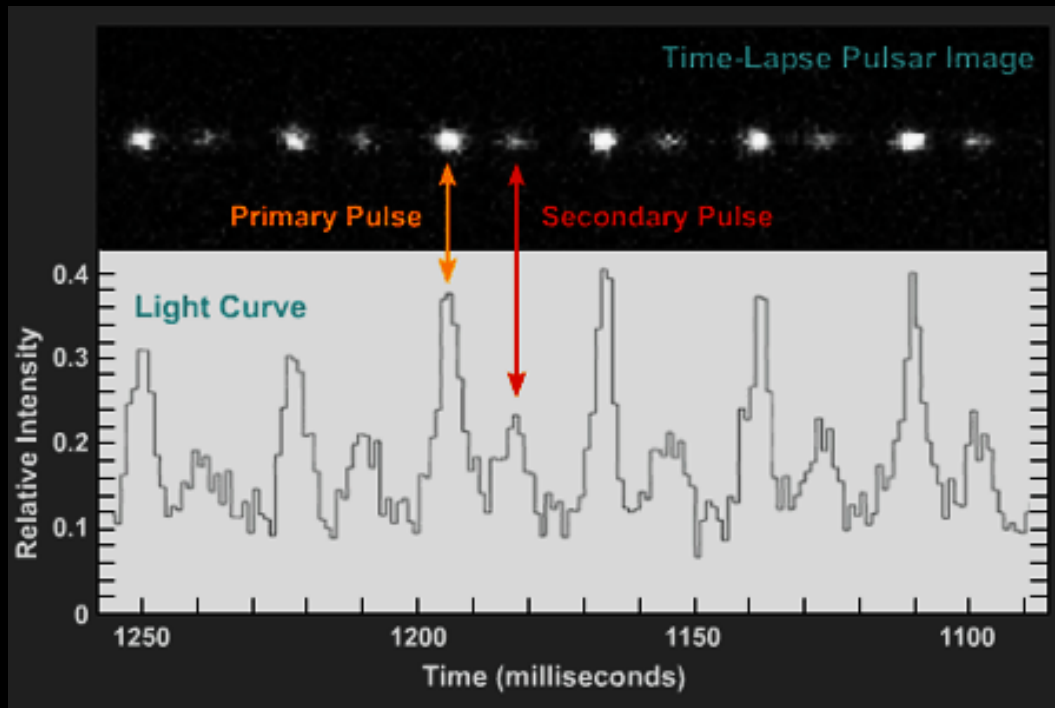
Charged particles spiral along the magnetic field lines in twin beams which sweep across

the sky as the star spins

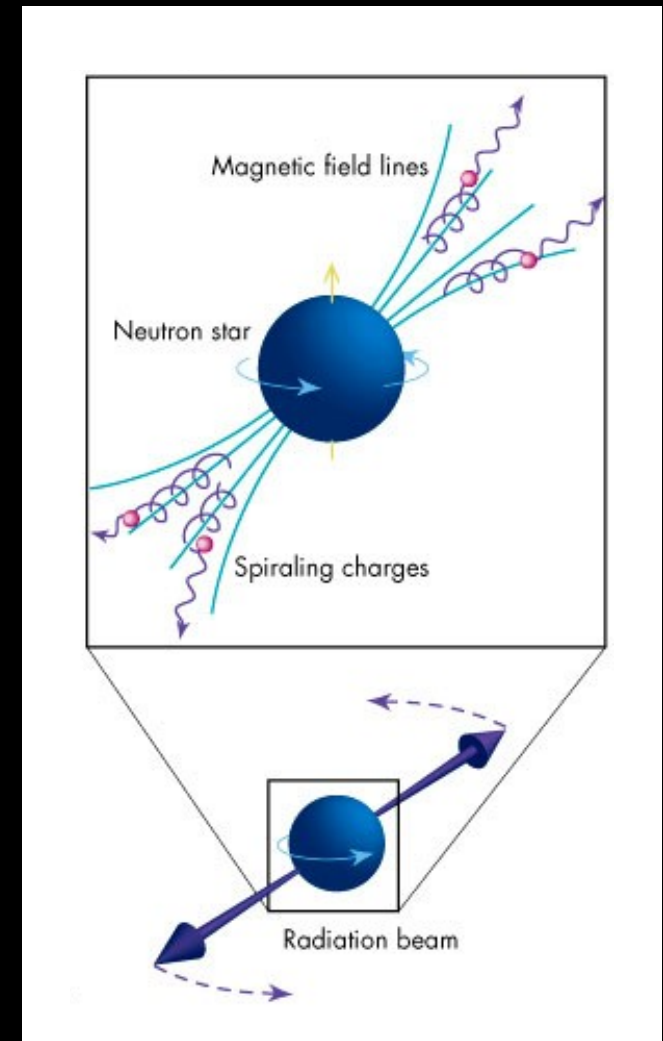


Star death

Pulsars – radio lighthouses

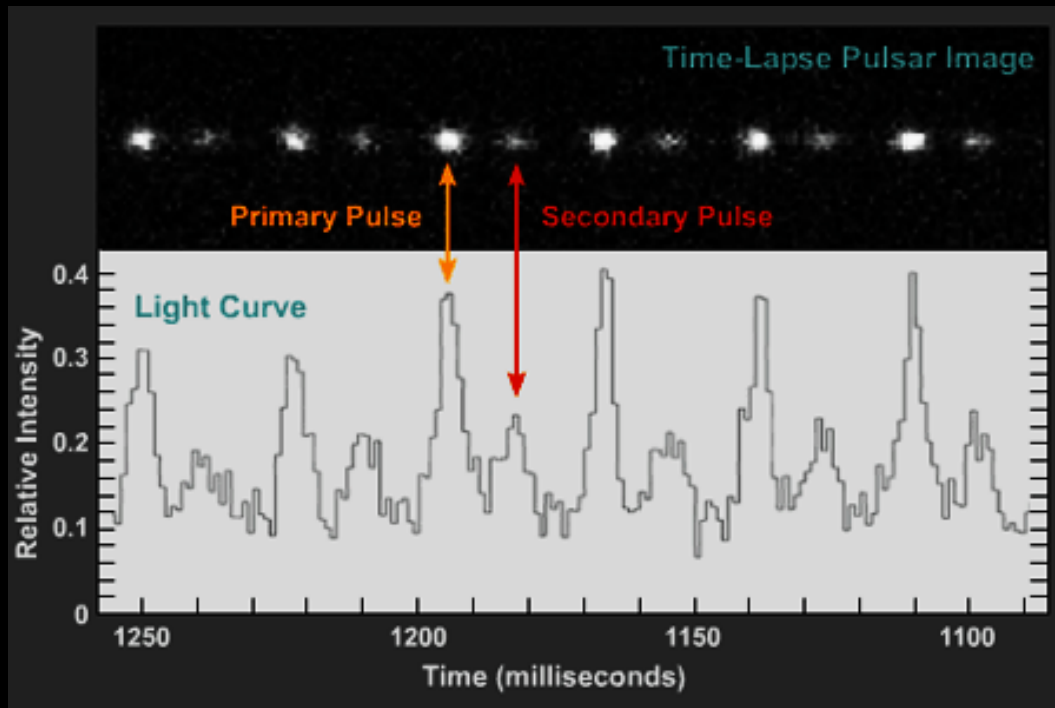


If one of the beams happens to sweep across the Earth, a radio telescope will detect a pulse with every rotation of the neutron star



Star death

Pulsars – radio clocks



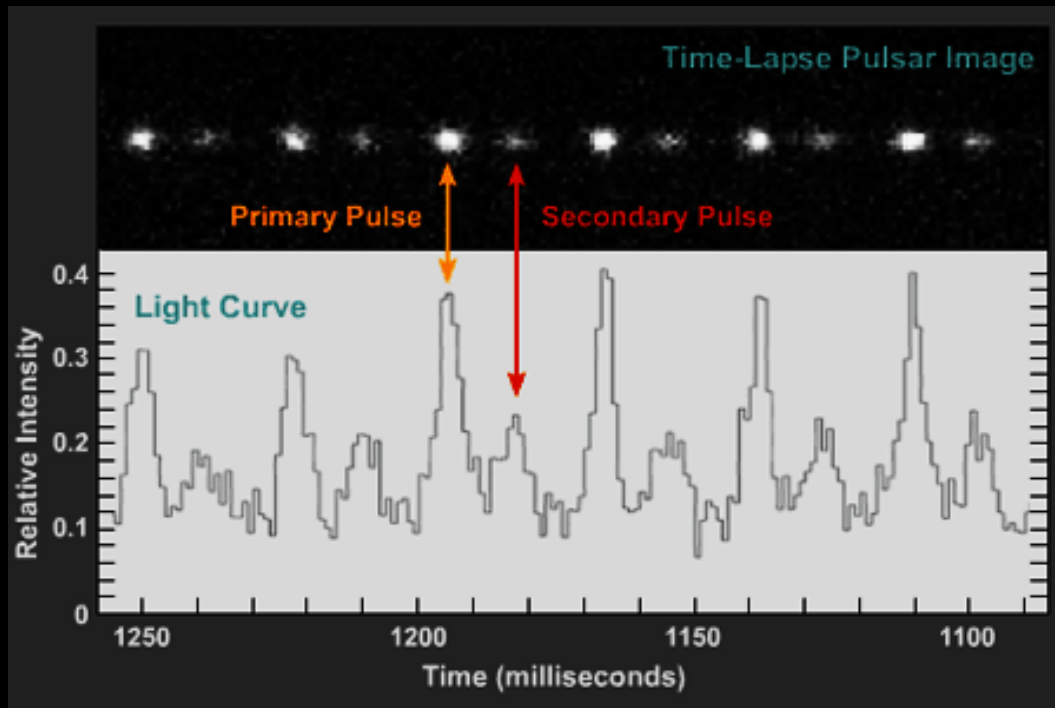
Pulsars are the most accurate natural clocks in the Universe

They slow down by 10^{-8} second per year

If one of the beams happens to sweep across the Earth, a radio telescope will detect a pulse with every rotation of the neutron star

Star death

Pulsars – radio clocks



If one of the beams happens to sweep across the Earth, a radio telescope will detect a pulse with every rotation of the neutron star

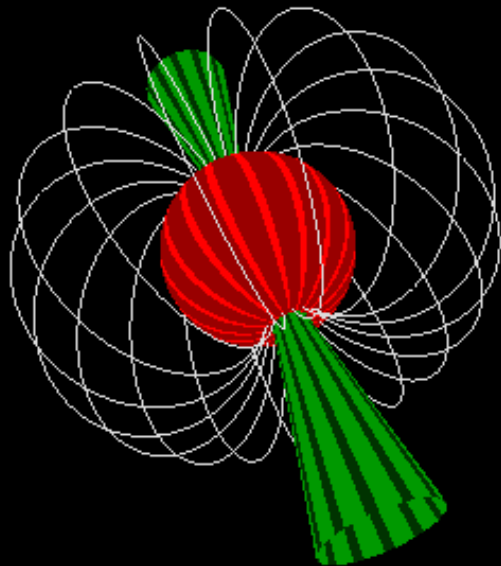
Pulsars are the most accurate natural clocks in the Universe

They slow down by 10^{-8} second per year compared to about 100 seconds per year for a digital watch



Star death

Pulsars – radio stations



[www.jb.man.ac.uk/
~pulsar/Education/
Sounds/sounds.html](http://www.jb.man.ac.uk/~pulsar/Education/Sounds/sounds.html)

If one of the beams happens to sweep across the Earth, a radio telescope will detect a pulse with every rotation of the neutron star

We can listen to the radio “broadcasts” of pulsars

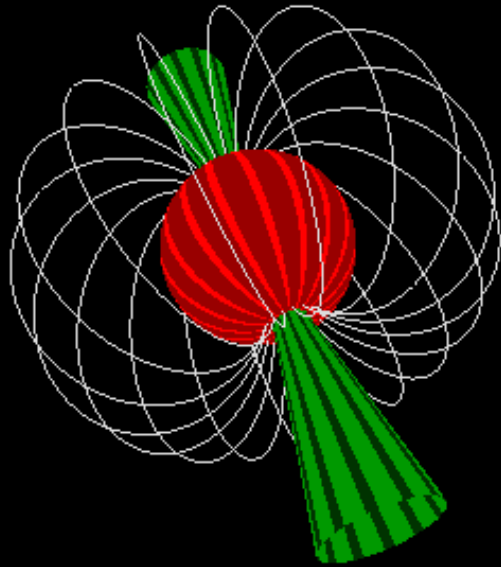


PSR B0329+54

Typical pulsar, with a rotation period of 0.714519 sec

Star death

Pulsars – radio stations



[www.jb.man.ac.uk/
~pulsar/Education/
Sounds/sounds.html](http://www.jb.man.ac.uk/~pulsar/Education/Sounds/sounds.html)

If one of the beams happens to sweep across the Earth, a radio telescope will detect a pulse with every rotation of the neutron star

We can listen to the radio “broadcasts” of pulsars

PSR B0329+54

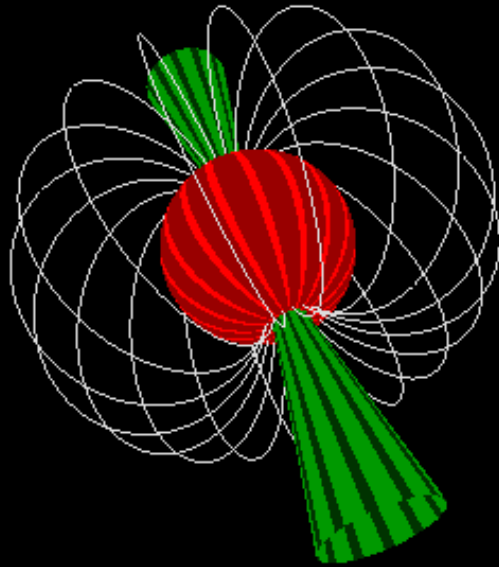


PSR B0531+21
The Crab Pulsar

Youngest known pulsar
at the centre of the
Crab Nebula
rotating about
30 times per second

Star death

Pulsars – radio stations



[www.jb.man.ac.uk/
~pulsar/Education/
Sounds/sounds.html](http://www.jb.man.ac.uk/~pulsar/Education/Sounds/sounds.html)

If one of the beams happens to sweep across the Earth, a radio telescope will detect a pulse with every rotation of the neutron star

We can listen to the radio “broadcasts” of pulsars

PSR B0329+54

PSR B0531+21

The Crab Pulsar

PSR B0833-45

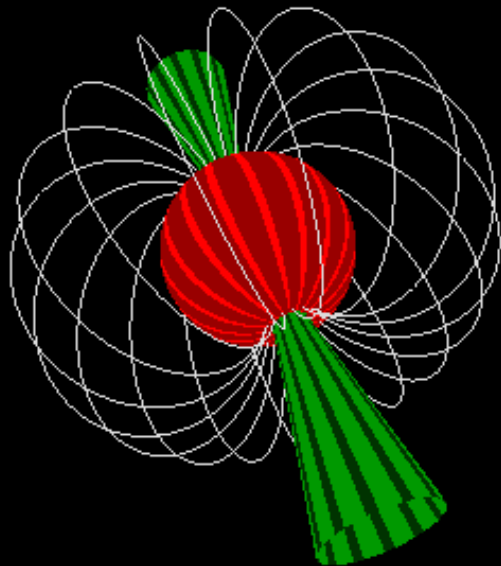
The Vela Pulsar



In the Vela supernova remnant, rotating 11 times per second

Star death

Pulsars – radio stations



[www.jb.man.ac.uk/
~pulsar/Education/
Sounds/sounds.html](http://www.jb.man.ac.uk/~pulsar/Education/Sounds/sounds.html)

If one of the beams happens to sweep across the Earth, a radio telescope will detect a pulse with every rotation of the neutron star

We can listen to the radio “broadcasts” of pulsars

PSR B0329+54

PSR B0531+21

The Crab Pulsar

PSR B0833-45

The Vela Pulsar



PSR B1937+21

rotation period of
0.00155780644887275 s

Star death


Pulsars – in a star cluster

The globular cluster 47 Tucanae visible only from the Southern Hemisphere contains 22 known millisecond pulsars many of which have a binary companion



Star death

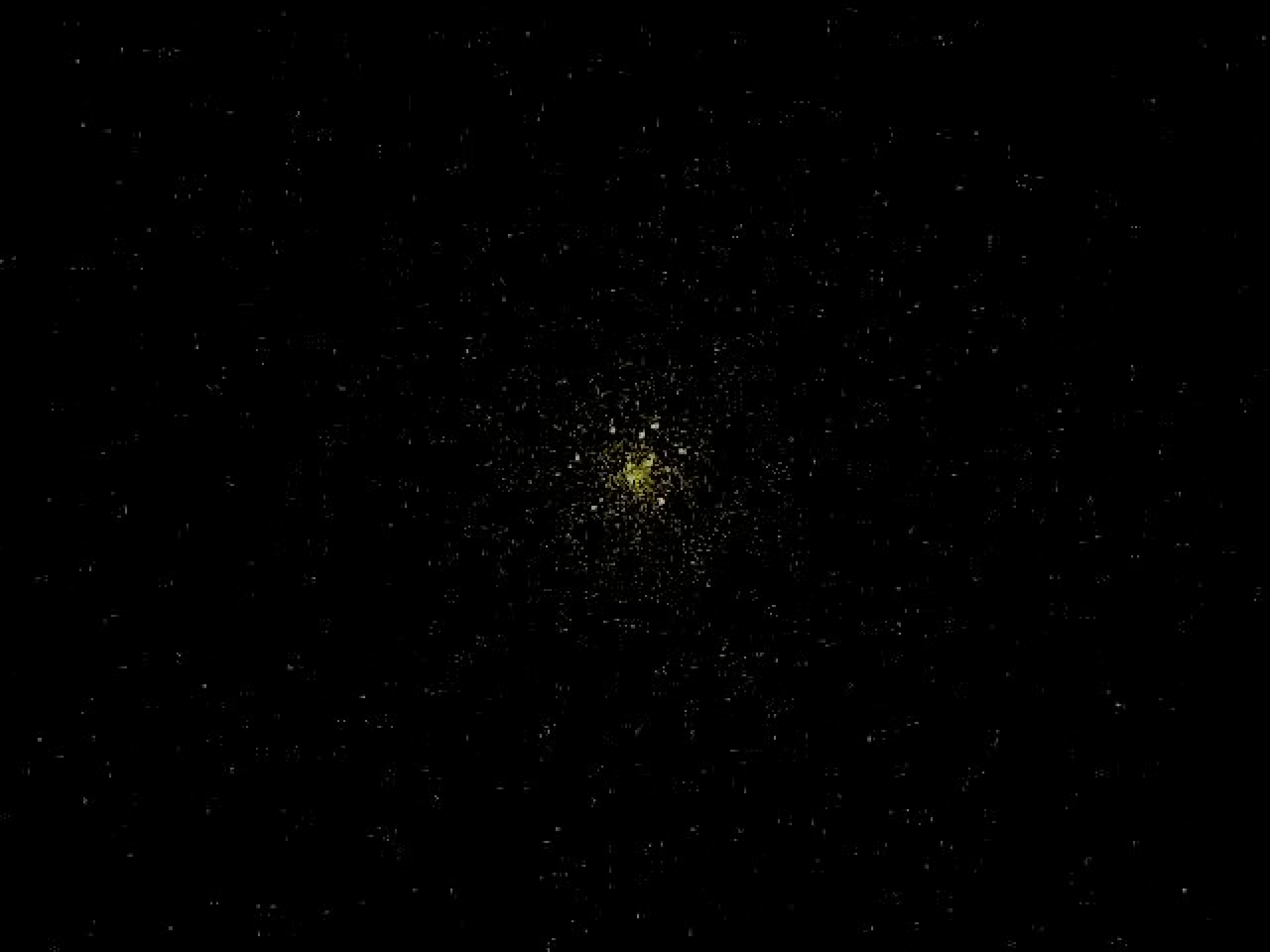
Pulsars – in a music video



The globular cluster 47 Tucanae visible only from the Southern Hemisphere contains 22 known millisecond pulsars many of which have a binary companion

Michael Kramer and Andrew Lyne of the Jodrell Bank Observatory have produced a “music video” of the cluster and 16 of its pulsars

The sounds you’ll hear are the true radio sounds of the pulsars but the images representing them are rotating several hundred times slower than reality



Normal is
the new
paranormal



Did any questions crop up?

