

Carl Sagan Says



- "These are some of the things Hydrogen atoms do, given 15 billion years of evolution"
- "We are, in the most profound sense, children of the Cosmos"
- "We are star stuff contemplating the stars"
- "Tell a man that there are 100 billion stars in our Galaxy and he'll believe you. Tell him a bench has wet paint and he has to touch it."

Warning, not really Carl Sagan quote.

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Astronomy 230

*Section 1– MWF 1400-1450
106 B1 Eng Hall*



This Class (Lecture 41):

Visits

Next Class:

Review

HW #8 due today.

FINAL EXAM is Dec 18th.

Music: Princes of the Universe – Queen

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Outline



- ET visitors?
- What conclusions can we draw from this class?
- What are UFOs?
- Pseduoscience.
- No evidence!
- Final words.

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What are we left with?



- These are two distinct but still very significant claims
 - The Earth has been visited by ETs.
 - The Earth has not been visited by ETs.
- Neither of these statements has been validated.
- So, the only statement we can make is
 - We do not know whether or not the Earth has been visited by ETs.



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<http://www.cgl.uwaterloo.ca/~csk/washington/graphics/logos/validated.gif>
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The ET Visitor Hypothesis



- So far no reliable evidence exists for ET visitation
- But, the idea that we have been visited and traces exist somewhere is a valid **THEORY**
 - Maybe improbable but still valid
- *Don't expect people to believe your theory unless it is substantiated with reliable evidence*

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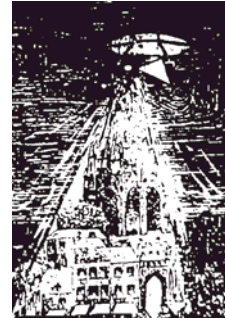
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UFO Before



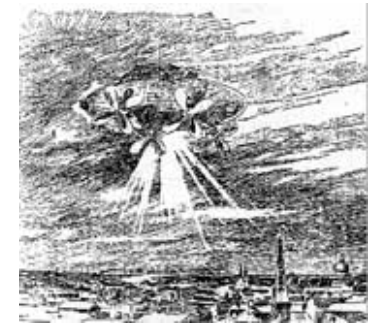
- First idealized UFOs around 1900.
- In Sacramento in 1896
- In England in 1906
- Blimp-like objects with search lights.



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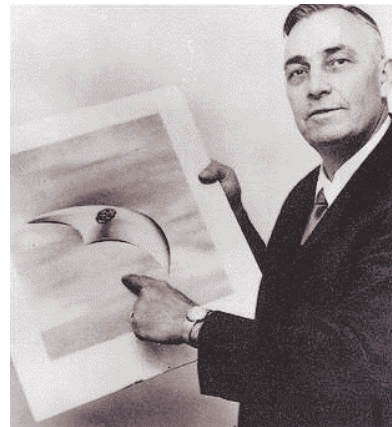
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Flying Saucer



- Modern sighting phenomenon from Kenneth Arnold in 1947 who told reporters that while flying a private airplane near Mount Rainier, he saw nine objects that moved like "a saucer skipping across the water."
- He actually thought they were government projects.
- Picked up by the pulps, and the number of sightings jumped.



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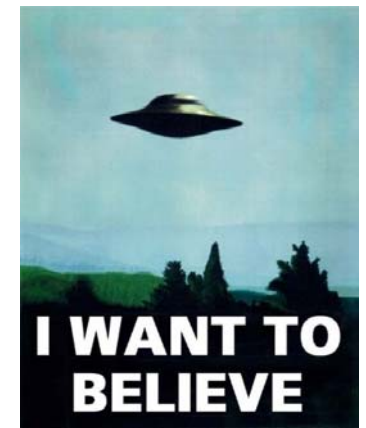
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UFOed



- The popularity is not very surprising
 - Jet planes first introduced at the end of World War II
 - Public aware of fast-moving aircrafts
- 50% of the public believe in the existence of UFOs as aliens visiting Earth.
 - Where there's smoke...
 - Not all of them can be wrong...



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UFOs



- What is a UFO?
- Can all/any of these sightings be traced to ETIs?
- Stands for **U**nidentified **F**lying **O**bject.
- Was introduced as neutral bureaucratese term to replace the emotionally charged term “flying saucer”
- Originally, the term UFO did not have anything to do with extraterrestrials.
- Scheme did not work, and now UFO has all of the connotations that “flying saucer” originally carried.



<http://www.screensavershot.com/misc/ufo-02a.jpg>

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Close Encounters?



Scientific approach– you gotta classify

1. Nocturnal lights: bright lights
2. Daylight lights: usually cigar or disk-like shaped.
3. Radar-visual: those detected by radar
4. Close encounters of the 1st kind: visual sighting of an unidentified object.
5. Close encounters of the 2nd kind: visual sightings plus physical effects on animate or inanimate objects
6. Close encounters of the 3rd kind: sightings of occupants in or around a UFO.

Carl Jung

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UFO Study Problems



- Why are UFO sightings hard to explain?
- Sightings must be explained “after the fact” without complete information.
- Sightings are based on eyewitness accounts, which are notoriously unreliable.
- Inconsistencies are often ignored.
- Humans seem to have a psychological need to believe in superior beings (→religion?).
- Failure to find a “normal” explanation is not evidence for alien visits.

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We Need Hard Evidence?



- A probe or remains of a probe somewhere on our planet or in our solar system
- The remains of ET biological activity somewhere on our planet or in the solar system.
- ET clearly announce themselves.
- If you expect to have your scientific investigation received seriously, you have to follow simple logic and common sense
 - The rules for the scientific method are just logic and common sense



http://www.biochem.wisc.edu/wickens/jpgs/2001_spac_odd.jpg

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UFO Phenomenon



- Some argue that we have proof:
 - UFO sightings.
 - Strange historical accounts or grand technological accomplishments of humans in the past.
 - Alien abductions.
- This all falls into the realm of pseudo-science.
- There has never been any concrete evidence of extraterrestrials having anything to do with UFOs.
- UFOs could be so very many things. Why assume automatically that there is an otherworldly explanation? But those who want to believe will do so even despite evidence to the contrary.
- In this class, we think that **"Extraordinary Claims Require Extraordinary Evidence"** - Carl Sagan.

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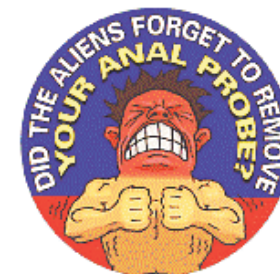
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Witness This



- In a court of law, testimony is used and it has to be judged for legitimacy
 - Bad testimony often gets judged as good and vice versa
- Science is not a court of law
 - We know that testimony can be flawed, so we can not rely on it as a reliable source of information
 - The mind can deceive or be deceived or it can relate observations accurately
 - We don't ever know which for sure



<http://www.buttonhouse.com/catalog/aliens-ufo.html>

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Pictures



- Pictures are getting close to evidence...
 - What is in the picture?
 - It could be forged (photoshoped)
 - It could be a misprint
 - It could be real
 - We don't know.
- Even if we have a picture or a reliable sighting of, say, a space craft the most logical explanation is still that a human-made object was seen.
 - Occam's razor.
 - We know that governments work on advanced projects in secret.
 - Without evidence of ET life, this explanation is simplest.



<http://home.tiscali.be/mathias.appelmans/alien.jpg>

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Ancient ET Visits?



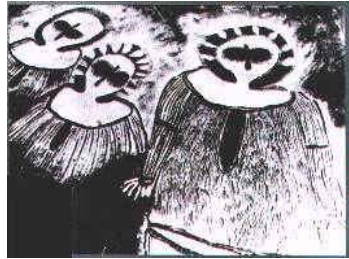
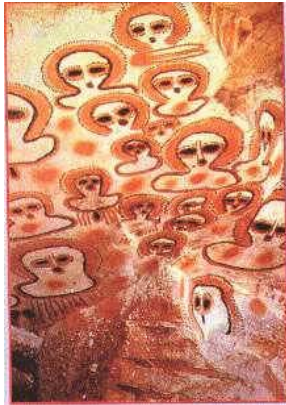
- There are a number of ancient images and artifacts that have been associated with UFOs by modern "UFO researchers".
- Let's look at some of those. They're easy to find on the web— too easy.
- If we can't really trust modern isolated photographs...maybe ancient or renaissance paintings?

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Cave Paintings



Images from an ancient eastern text Prajñâpârâmita - Suna



<http://homepage.ntlworld.com/jackaram/>

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The Madonna with Saint Giovannino



Foto: Diego Cuoghi, 2003

Domenico Ghirlandaio– 15th century.

Foto: © Diego Cuoghi, 2003

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The Annunciation with Saint Emidius



Carlo Crivelli– 15th century.

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The Crucifixion



A fresco above the altar at the Visoki Decani Monastery in Kosovo, Yugoslavia– 14th century.



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The Baptism Of Church



Aert De Gelder–
18th century.



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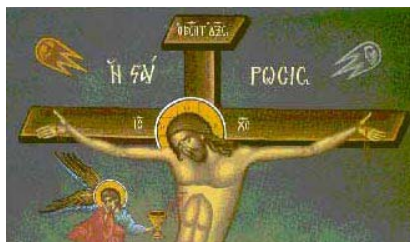
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<http://homepage.ntlworld.com/jackaram/>

Symbolic Symbolism



- Biblical references have become completely incomprehensible to modern man.
- The symbols were a way to express meaning to illiterate populace.
- Early humans needed a way to express symbols of god, weather, or whatever and the sky is magical.



http://www.sprezzatura.it/Arte/Arte_UFO_6.htm



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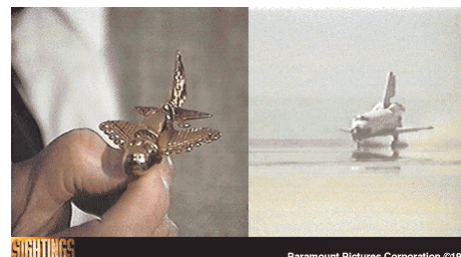
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Amazing or Ordinary?



- We have no reliable evidence that ET's helped to build the pyramids or any other amazing artifacts.
- We do have plenty of evidence of humans doing extraordinary things when working in concert
 - What is the most logical explanation?



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<http://homepage.ntlworld.com/jackaram/>
<http://www.aegypten-online.de/images/giza/pyramid.jpg>

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Pseudoscience



- Although there are numerous examples of interesting paintings, drawings from the middle ages or ancient times can not sensibly be used as evidence of UFO visitation!
- The most logical explanation is that people saw something in the sky (a comet or meteorite or clouds) and let their imaginations run wild.
- Strange sights do not mean aliens.



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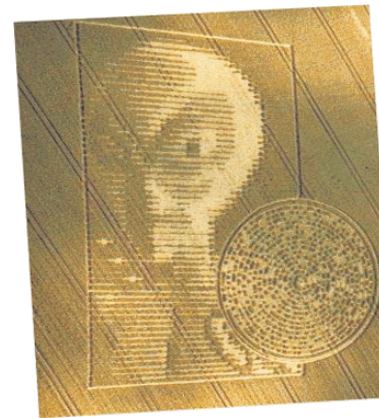
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Crop Circles

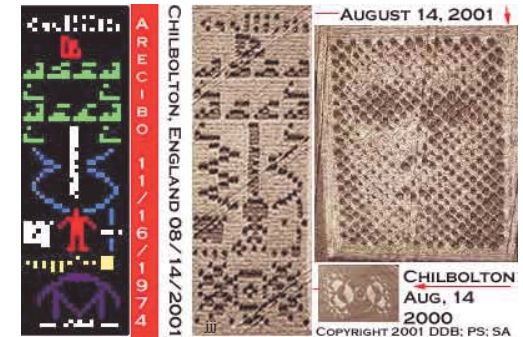


- Clearly shown to be man-made structures.
- No one has seriously studied them.



<http://amo.net/contact/>

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Give Me Real Evidence!



- Evidence:
 - A piece of a probe or spaceship
 - Some trace that can be uniquely linked to an ET probe
 - Biological material.
 - A reliable, logical calculation
- That is the same we require of ANY scientific investigation

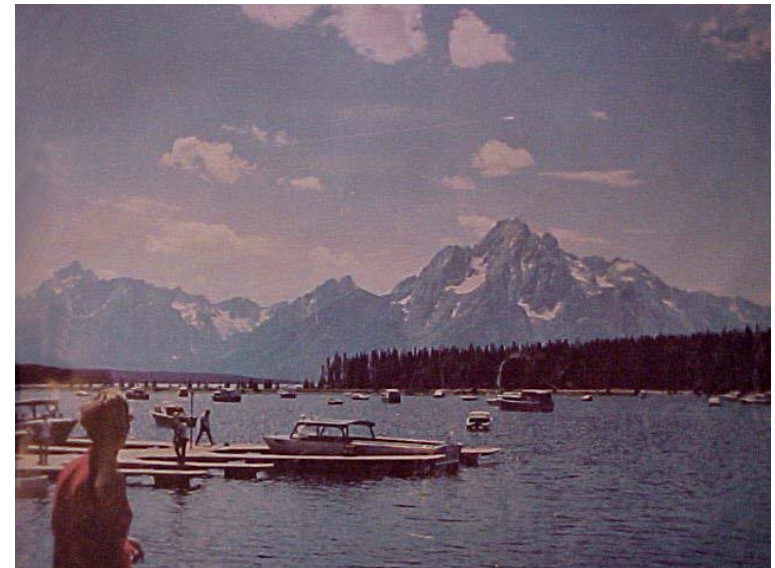


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<http://www.alien-ufos.com/images/ufos/misc/ufos4.jpg>

An Example: Meteor 1972



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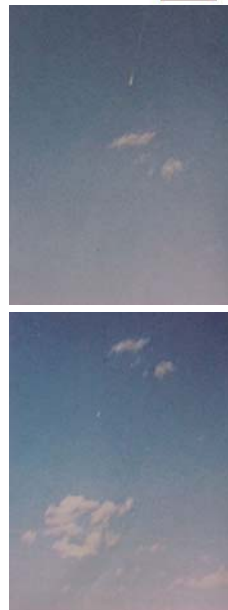
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<http://www.uweb.edu/dutchs/>

Yikes, a Near Miss



- A bus sized object entered atmosphere over Utah and exited over Canada
- Velocity of 15 km/sec
- Missed Earth by 58 km



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But...



- Event was completely unexpected
- Crossed relatively sparsely-inhabited region
- Only visible for a *total* of 101 seconds
- Visible for no more than 30 seconds at any one spot
- Nonetheless, we have dozens of clear photographs of this event
- Still we have no comparable images of UFOs.
- And today digital cameras and camera phones should make unusual events even more seen.



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Problems?



The large number of sightings argues against alien spacecraft.

- Space is freaky big.
- There are extreme difficulties of interstellar space travel and the number of planets to explore.
- So, why would so many alien spacecraft be visiting the earth constantly?
 - There are other planets to check out.
 - What makes us so interesting?
 - We should not overestimate our significance.



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Propulsion Detection



- Only if interstellar techniques become really easy will visits be possible.
- We would probably see them coming.
- Nuclear fusion and antimatter propulsion would produce copious gamma rays– easily detected.
- If a spacecraft decelerated from c within 1 AU of the Earth with mass $>$ few tens of grams would be detected.



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<http://www.yougottareadthis.com/videofiles/ufu.jpg>

Condon Report



- There were numerous government studies on the topic of UFOs– some very biased.
- The main one of importance was the only scientific study of UFOs called the Condon report (1969).
- “The report concludes that there is no evidence to justify a belief that extraterrestrial visitors have penetrated our skies and not enough evidence to warrant any further scientific investigation.”

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Conspiracy or Science Disinterest?



- Government Cover-up?
 - Motive to avoid alarm: 50% already think that aliens have landed
 - But, U.S. Government notoriously unable to keep secrets known by many for a long time
 - All other governments need to participate in a large-scale conspiracy
- Scientific disinterest?
 - Stems from lack of real evidence, not disinterest
 - If there was serious evidence, or the chance to obtain serious evidence, scientists would **jump** at it

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Some Real Facts



- The fact that the majority of humans live in cities with very little familiarity with the sky goes a long way to explaining most UFO sightings.
- How many of you have ever seen ball lightning?
- The planet Venus is mistaken for a UFO all the time because it is very bright, is often viewed low to the horizon and therefore experiences atmospheric scintillation which makes its color change rapidly.



<http://www.meteoros.de/ufo/venus.htm>



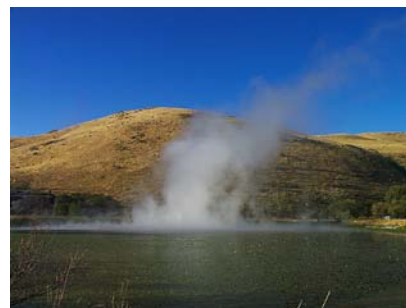
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Some Real Facts



- Have you ever seen a stealth fighter or bomber in flight?
- What about swamp gas?
 - decaying organic matter turns gaseous and on extremely rare occasions takes on certain properties of luminescence
- Insect swarms flying through electric fields?
- All of these things are in the sky and most people have no idea what they are looking at when they see them.



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Alien Abductions



- Alien abduction stories bare a resemblance to post traumatic stress disorder.
- People experience something horrible in their lives and their brains suppress the memories.
- The memories remanifest in dream-like states where the mind is highly susceptible to confabulation and fantasy.
- The stories often involve elements that sound like a condition called *sleep paralysis*.



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Alien Abductions



- When you are in REM sleep and are dreaming your body paralyzes the major voluntary muscles so that you cannot injure yourself while you dream.
- Sometimes we can fall into dream states before we have become completely unconscious. Our bodies become paralyzed and we can even dream in the state, but yet we are also partially awake. It's called *waking dreams* it's a real and studied phenomenon.



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Expect to See



- Descriptions of aliens do not reflect the expected diversity of life elsewhere, but do reflect psychological biases of observers. Descriptions are almost always humanoid and usually male



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Your Call



- We have no reliable evidence to support actual ET contact.
- We have evidence that people historically make up stories about things they imagine to be linked to a light in the sky
 - So, what is the most logical explanation?

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Open Your Mind?



- Yes, as we have justified, it is possible that an ETI civilization has visited the Earth at some point in its history
- It is a legitimate scientific question to investigate this
- **We need legitimate scientific evidence in order to believe this theory**

Bottom-line



- We have probably not been visited by aliens; there is no evidence.
- To me, alien reports are images of human psyche.
- But, our Drake equation estimate suggest that extraterrestrial life is common.
- So the Fermi Paradox: “Where are they?”
- I would argue that we keep trying to figure out the Universe, look at the concept of extraterrestrial life with a critical eye, fill in our gaps of knowledge, and the search is on.