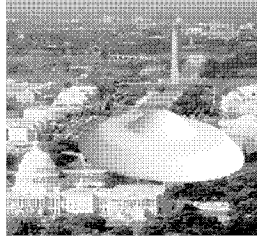


Monday, November 29  
Have Aliens Visited Earth?



Have you submitted your SEIs?

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Have Aliens Visited Earth?  
Key Concepts

- 1) Extraordinary claims require extraordinary evidence.
- 2) Absence of evidence is not evidence of absence.
- 3) It's hard to prove a negative.

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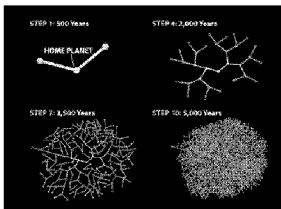
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If an intelligent species developed spaceflight at 10% the speed of light, it could colonize our entire galaxy in ~10 Myr.



It could do this with "manned" starships or self-replicating robots.

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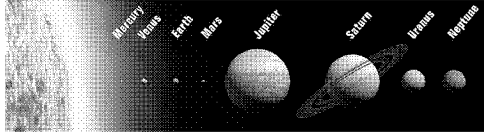
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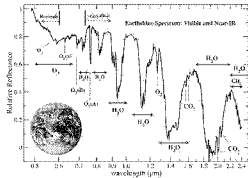
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**Our planetary system might seem like an intriguing one to visit.**



It has a well-behaved star & multiple planets.

One planet has spectral signatures of methane, water, and oxygen.



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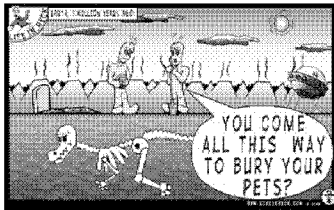
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**It's not impossible that the Earth has been visited by extraterrestrial spacecraft.**



What would constitute persuasive proof of such a visit?

Extraordinary claims require extraordinary evidence.

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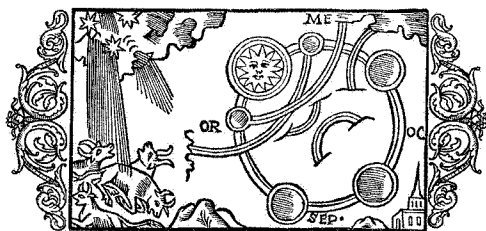
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**People have seen "unidentified flying objects" (UFOs) throughout history.**



Olaus Magnus (AD 1555)

Relatively recently, some UFOs have been identified by some people as alien spacecraft.

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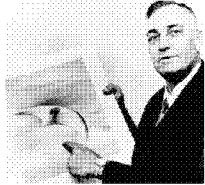
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The origin of the term "flying saucer":



June 24, 1947: Kenneth Arnold, flying near Mt. Rainier, saw 9 UFOs that moved "as a saucer would if you skipped it across the water".



He didn't describe them as saucer-**shaped**, but reporters adopted the term "flying saucer".

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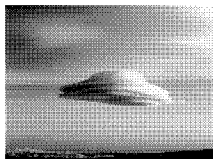
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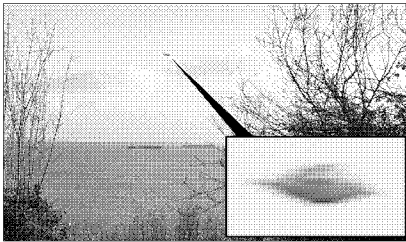
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A side-effect of the "flying saucer" misnomer: **lenticular clouds** are sometimes misidentified as UFOs.



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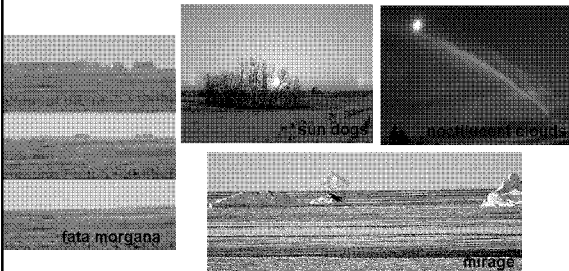
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Known atmospheric phenomena are highly diverse.



IMO, strongly identifying a UFO as a spacecraft requires physical evidence (exotic alloys? quantum computers beyond our capabilities?)

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### How about the Roswell Incident?

July 1947: Rancher finds debris near Roswell, NM; much excitement because of the "flying saucer" outbreak.

Roswell Army Air Field describes it as the remains of a weather balloon.

Excitement abates.

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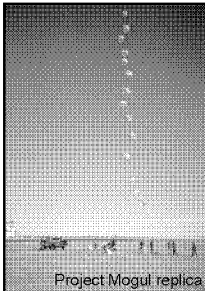
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### Roswell, thirty years after:

1978: Stanton Friedman interviews witnesses & claims that the Army recovered a spacecraft (+ crew).

1994: Air Force reveals that Roswell wreckage was of a top-secret balloon experiment (Project Mogul), designed to detect Soviet bomb tests.

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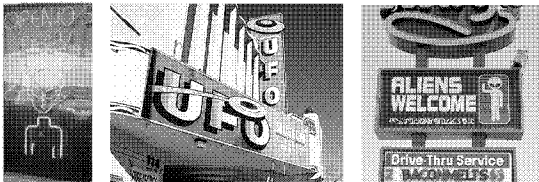
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Of course, some people believe that the Air Force explanation is a cover-up.



Certainly, the inhabitants of Roswell have a strong economic incentive to adopt the "alien crash" theory.

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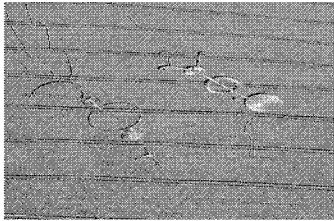
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Crop circles appear in grain fields (often wheat) all over the world (but often in England).

Are they created by aliens?



IMO, no.

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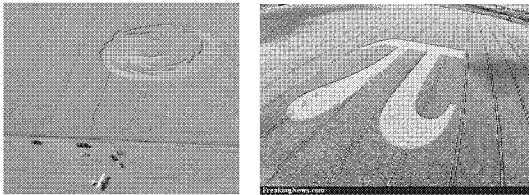
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Crop circles can be made by human beings. (In fact, there are crop circle competitions.)



Why would an advanced alien being travel several light-years to do the same thing that human pranksters can do?

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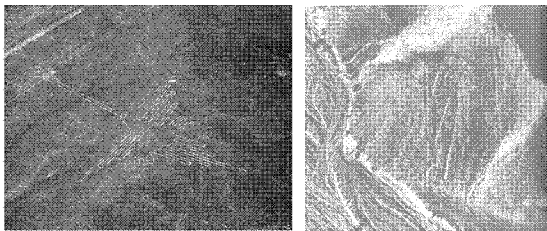
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“Ancient astronauts” hypothesis: alien beings visited Earth early in human history, and helped cultures build large monuments.



Patterns on the Nazca desert in Peru, made ~2000 years ago.

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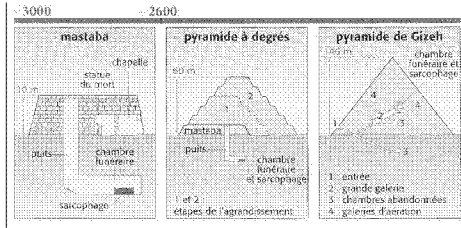
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IMO, the "ancient astronauts" hypothesis slanders early civilizations.



For instance, the Great Pyramid of Giza (sometimes attributed to ancient astronauts) is a logical evolution from earlier Egyptian structures.

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There's no strong evidence for past visits by alien beings to Earth.

However...

Absence of evidence is not evidence of absence: a long-ago, temporary visit would not leave traces.

It's hard to prove a negative: the statement "Aliens **never** visited Earth" is extraordinarily difficult to prove.

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Tomorrow's Lecture:  
The Fermi Paradox

Final Exam:  
Tuesday, Dec. 7, 1:30 pm

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