

UFOs and Alien Visits

According to polls, about a third of Americans believe that we are being visited by flying saucers. If so, this would be profoundly important, since it would prove the existence of not just life, but technologically superior intelligent life. What is the evidence for this? In a larger sense, how much evidence should we demand to believe in alien visits? In this class we will go over the evidence and the psychology of belief. The net conclusion from my standpoint is that there is not a shred of definitive evidence for alien visits now or in the past, but that this demonstrates the eagerness people have to believe fun things :).

Levels of belief and the burden of proof

We will start by discussing several levels of belief, and how they apply to assessment of evidence. Levels include:

- True believer. The phenomenon in question has been established beyond any possible doubt, and no further data or disproof of apparent evidence will make a difference.
- Hopeful believer. Willing to accept disproof in individual cases, but still has a firm belief in the overall phenomenon. Consider Cubs fans, who are disappointed year after year but still believe starting the next season.
- Genuinely neutral. Has not made up mind yet, and thinks that arguments for or against a phenomenon are about equally strong. Alternatively, has simply not cared enough to make a judgment.
- Persuadable skeptic. Thinks that no current evidence for the phenomenon is enough for belief, but if strong enough evidence is presented they can accept it.
- Entrenched skeptic. Not only is current evidence inadequate, but no conceivable future evidence would be enough for belief.

All of us combine these approaches in different situations. For example, I am a true believer in gravity and that it makes things fall. If I were to see something that apparently contradicted this, e.g., my car slowly rising into the air, then rather than disbelieve in gravity I would assume that either some other force was countering gravity or that I was having a hallucination. Quite a fair number of UFO enthusiasts are in this category. What most people would consider weak evidence, they consider conclusive. If flaws or contradictions are pointed out, the reaction is anger or an assumption that somehow the all-powerful government has suppressed or altered the evidence. I'm happy to say, though, that by far the majority are hopeful believers. They think that various sightings and reports of abductions are too numerous to all be false, but are perfectly happy to hear counterarguments to any particular case.

You can, of course, have equally strong feelings on the other side. I am, for example, very close to an entrenched skeptic about telekinesis, which is movement of objects with just the power of one's mind. If I saw something that appeared to be such movement I would suspect a magic trick or that I was dreaming. It would take overwhelming evidence to convince me that it was real.

Phrased this way it may appear that there is symmetry between the levels of belief. In practice this means it may not be obvious how solid the proof has to be for alien visitation to be accepted. In particular, suppose that I report to you that I saw a flying saucer in the sky last night. Is it up to me to provide definite evidence, or is it up to you to prove me wrong?

The burden of proof issue underlies much of the discussion of UFOs and aliens. I've had plenty of people describe some incident to me and then challenge me to show that it had a natural explanation. However, I think we can phrase things a bit more objectively by asking how important or how unusual the claim is. If it is really spectacular, the bar is raised. As Carl Sagan said: "extraordinary claims require extraordinary proof."

For a practical example, imagine that I told you that yesterday I saw a friend of mine walking down the street. Your natural reaction would be to accept this statement without any further thought. But suppose I told you that yesterday I saw a 100 foot tall cyclops walking down the street. If you didn't just dismiss me immediately as insane, you would probably ask for absolutely ironclad evidence. But why? It comes down to the second claim being so overwhelmingly at odds with what you know about the world. If such things existed it would have profound consequences for, among other things, the existence of other intelligent life forms. Therefore, you require stronger evidence than for everyday occurrences.

Similarly, if intelligent aliens are buzzing us every now and then, this would count as the most important discovery in the history of humanity. It would profoundly alter our conception of our place in the universe. As a result, I think it is clear that the evidence has to be unquestionable for us to accept it. With that in mind, how strong is the evidence?

Ancient monuments and ancient astronauts?

In 1968 Erich von Däniken published "Chariots of the Gods?", which sold millions of copies and convinced many people that evidence for alien influence is hidden in plain sight. The idea is that many ancient monuments such as the pyramids or Stonehenge could not have been created by the people of the time, hence aliens must have helped them. He made additional claims, such as that world religions originated after contact with aliens viewed as gods, but let's consider a few of the monuments and whether extraordinary explanations are necessary.

First, the pyramids of Egypt, specifically the Great Pyramid of Khufu (or Cheops).

This is the only one of the seven wonders of the ancient world that is still standing, and it's impressive. On construction, this mighty monument was thought to be 147 meters tall and have a mass of some 5.9 million tons. Individual blocks had an average weight of about 2.5 tons. The four sides of the base are of equal length to an average of just 5.8 cm, compared with a length of about 231 meters, and are just a minute of arc away from a perfect square. The square's sides are beautifully aligned with the cardinal points of the compass, with one side pointing just 3 minutes of arc from true north (not magnetic north). To top it off, the ratio of the circumference at the base to the height at construction is within just 0.05% of the value of 2π , the ratio of the circumference of a circle to its radius.

Really impressive! von Däniken looked at this and concluded that it would have been far beyond Egyptians of 2560 B.C. to make such a huge yet precisely engineered pyramid. His conclusion was that advanced aliens had to be involved, and as we don't have historical records of the construction this is possible. However, following our principle that airtight evidence would be needed for such a hypothesis, we need to ask whether there is another possibility.

A variety of plausible suggestions have been made, and modern archaeologists have actually put some of them into action to show how this could be done. For example, using only technology that existed at the time, it was possible to carve blocks of that size from nearby quarries and transport them using wheels and inclined planes to the pyramid. With 100,000 men and 20 years, a structure the size of the pyramid could have been constructed. Another interesting suggestion is that the blocks could have been manufactured in place with a kind of limestone concrete. Either idea would have been possible to use at the time, without aliens. It is also useful to note that the Great Wall of China, for which we have abundant historical records of its (human!) construction, contains about 120 times the volume of stone of the Great Pyramid, and was constructed and reconstructed over about two millennia. What it comes down to is that when you combine an all-powerful ruler with human ingenuity and a lot of manpower, remarkable (albeit non-functional) things can be done.

Another mystery that pegged von Däniken's alienmeter was the remarkable statues of heads on Easter Island. The largest of these weighs 82 tons, and many are far from their original stone sources. von Däniken again proclaimed the movement of these statues to be beyond the capabilities of the poor natives. It may not surprise you to know that anthropologists have since shown how, using only the tools available to the natives at the time, it was possible to cut the stone out of quarries, chisel them to resemble the statues, and move them long distances (using sleds). The statues have a long and complicated history, including the thought that the breakage of many of them was a last-ditch attempt to release bound magic and restore the ecosystem. Fascinating stuff, but nothing to do with aliens.

The rest of “Chariots of the Gods?”, and indeed other evidence of this sort claimed by different authors, is all of this type. It basically comes down to argument by personal incredulity: “If I can’t figure out how ancient people did this, it means they didn’t, and the only alternative is aliens.” In many ways it insults the capabilities of some pretty impressive civilizations. In any case, it certainly comes nowhere near the incontrovertible evidence we demand, so we need to move on to other claimed evidence.

UFOs

On its face, calling something a UFO is noncommittal: it means unidentified flying object, so theoretically a type of airplane that I can’t identify is a UFO to me. Common usage, however, equates “UFO” with “flying saucer” or some other clearly alien conveyance. Large numbers of people are convinced that not only do flying saucers make frequent appearances in our skies, but that our government is actively covering up the evidence, sometimes with dire consequences for the heroic souls who blow the whistle. But how good is the evidence?

Some people date the first “report” to Ezekiel, chapter 1. In verse 4 we read “And I looked, and, behold, a whirlwind came out of the north, a great cloud, and a fire infolding itself, and a brightness was about it, and out of the midst thereof as the colour of amber, out of the midst of the fire.” Later we learn about wheels within wheels and a number of other cool details.

There are, of course, multiple natural phenomena that can easily be mistaken for flying saucers, particularly given the difficulty that we have in recalling details correctly. Venus has often been reported as a flying saucer (including by Jimmy Carter!). Meteorite fireballs are sometimes misidentified as well. Other phenomena include fascinating electrical effects such as ball lightning and “sprites”. The main claims, however, try to focus on events that bypass such identifications.

In modern history, UFO sightings ramped up in 1947 after a private pilot named Kenneth Arnold reported nine brilliantly bright objects flying at incredible speed near Mount Rainier, Washington. Later that year was the famous Roswell incident, which to this day probably has the strongest grip on the imagination of any UFO report. The story is that on June 14, 1947, a ranch foreman named Mac Brazel noticed a strange cluster of debris some 30 miles north of Roswell. He said that he and his son saw a “large area of bright wreckage made up of rubber strips, tinfoil, a rather tough paper and sticks.” UFO enthusiasts have latched onto this as proof of a crashed flying saucer, and this has made its way into endless realms of popular culture since its repopularization in 1978.

There has been such interest in this incident that in 1995 the Air Force released a report that said that the debris was in fact from a top-secret military program, but not one involving aliens. Instead, this was from Project Mogul, in which the Air Force flew high-

altitude balloons with the intent of detecting sound waves from turbulence caused by Soviet atomic bomb tests. In response to claims after the fact of alien autopsies and the like at Roswell, the Air Force released a second report in 1997 which concluded that in addition to some specific hoaxes, some of the contributing factors included foggy memories after decades and even the occasional recovery of anthropomorphic dummies from other projects, such as Operation High Dive, which tested high-altitude parachutes.

How can we evaluate this? From our standpoint of requiring rigorous evidence for such an exciting discovery, Roswell obviously does not qualify, because the Air Force's explanation fits the facts and doesn't need the invocation of unknown entities. However, UFO enthusiasts stoutly deny that the Air Force is telling the truth. This is an example of a conspiracy theory. These play such a powerful role in UFO lore that we will take a minute to address these directly.

Conspiracy theories

This is a special category of hypotheses. Essentially, some powerful organization (often the government, sometimes a shadow group) is actively suppressing information. This might be about aliens, but has also been applied to events such as the assassination of President Kennedy. This organization also spreads disinformation so, for example, in the Roswell case it made up a story about a top secret program that appeared to explain the evidence but that is a diversion from the real story about aliens.

Conspiracy theories are special because they can never be disproven. Do you think you have evidence that disproves my hypothesis? The government planted it. Why wouldn't anyone speak up about these world-changing finds? Because the government silences them. But then how can authors freely publish? Because they are heroes who have evaded the otherwise all-powerful organization. If the government is so good at covering up alien landings and preventing there from being any definitive evidence, why haven't they been able to put the lid on scandals such as Watergate? Because they want to *seem* incompetent to throw us off the trail.

What this comes down to is that if you think that you and a few other brave souls are the only ones who have penetrated the cloak of darkness surrounding the evidence, you are a true believer and nothing will convince you. However, let's return to the level of evidence we need. Does Roswell satisfy our criteria? Clearly not. It could in principle, if we had an actual alien ship, unknown metals, or alien bodies, but none of this exists.

Alien abductions

The last piece of evidence to examine is alien abductions, in which it is claimed that a person is actually taken aboard a flying saucer and then returned, sometimes after having invasive experiments performed on them. Some claims are undoubtedly deliberate hoaxes,

but with thousands of reports it seems unlikely that all are lying. In fact, many of the putative abductees are rational, ordinary people. Hard evidence is entirely absent (e.g., alien flesh or alloys not found on Earth), but how could so many reports be anything but results of real abductions?

As we've emphasized throughout, the burden of proof is on those who claim these experiences, and with no hard evidence it fails our requirements. Nonetheless, there are some known phenomena that are very similar to these experiences as well as to reports from centuries ago. These are waking dreams combined with sleep paralysis.

Have you ever had a time, just before going to sleep or just after waking up, when you are not quite awake but can see your bedroom and things in it? In such a situation you can have a waking dream, in which other things and entities appear present. For example, I have had times when I have awakened in the middle of the night realizing that someone is looking at me through my bedroom window. After hiding and then waking up a bit more, I realize that (1) my bedroom is on the 15th floor of my building, and (2) my shades are drawn, so real as the experience seemed it didn't happen! Compounding the sensation of fear that these dreams can produce is that we have a natural state called sleep paralysis. When we sleep we don't move as normal, which is good as it prevents us from walking off a cliff at night. However, when awakening, it can happen that for a few seconds one can't move, which can be particularly terrifying if one is also having a waking dream that there is some other thing in the room. Combined, these effects explain centuries-old reports of attacks by demons at night, and many of the reported instances of alien abduction. Once again, the lack of hard evidence means that we cannot conclude that aliens are among us.

Some perspectives

In my opinion, most people who report strange things in the sky or terrifying experiences at night are doing their best to do so accurately, without fabrication. However, nothing passes the strict standards that we must set for such important claims. In addition, one has to wonder about the plausibility of advanced aliens acting as they must if the reports are real. For example, how could they avoid definitive detection (and I'll remind you that there are endless public telescopes and sensors that could not all be censored at once) but be seen constantly by ordinary people? If their intent is to sneak around, why would they do this? That is to an extent an unresolvable question about alien psychology, but note that the distance they would have had to travel is so enormous that it boggles the mind that they would expend such resources for no obvious purpose. Also note that much of the probing that they are reported to do during abductions speaks to staggeringly primitive biology given the required mastery of the physical sciences needed to get here at all.

Fundamentally, I think that reports of aliens are fascinating reflections on human psychology. It would be cool if they were real (although maybe not; watch the Twilight Zone

episode “To Serve Man” for some chills), but the odds are strongly against it.