

RESEARCH  
ARTICLE

# Core Anomalous Experiences Shared Across Diverse Citizen Science Datasets

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## HIGHLIGHTS

A fresh study shows that a century of citizen-led investigations into unexplained phenomena form a coherent scholarly tradition and, using modern machine learning on four large databases, reveals a shared cluster of reports that reflects core themes of the anomalous experience.

## ABSTRACT

Scientific investigation of unidentified anomalous phenomena (UAP) extends to the early origins of citizen science. Scientific activity by non-professionals (citizen science) has historically produced real discoveries, often focuses on subjects understudied by professional scientists, involves interaction with speculative fiction, and has a century-long history of amassing large databases of anomalous events. Through historical analysis, I show that while it exists in a liminal space adjacent to professional science, citizen science of anomalies is a reasonably coherent scholarly tradition. I then engage this tradition by applying modern machine learning and artificial intelligence tools to four anomalous events databases to examine whether quantitative lexical analysis can extract a core anomalous experience that is shared in common across them. The analysis identifies a cluster of documents from diverse authorship sources. This document cluster appears to have greater frequencies of many themes that were proposed by prior qualitative analysis to be part of the core anomalous experience.

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## KEYWORDS

UAP, UFO, cluster analysis, LLM, history.

## INTRODUCTION

In the first part of this article, I lay out a case that the lines between fact and fiction are blurred in the study of anomalous phenomena such as unidentified flying objects (UFOs), recently redubbed and broadened as unidentified anomalous phenomena (UAP). These experiences have a liminal existence (in between) fact and fiction because they frequently elude rigorous scientific methods of controlled observation, but they also are not outside the domain of

science because they constitute both empirical observations and creative theories, which are both grist for the scientific mill. Citizen (non-professional) researchers play an important role in this liminal space.

In the second part of the article, I combine four datasets from the past 100 years of citizen anomalies research and analyze them with a combination of manual and machine methods. I test a hypothesis that has existed for over 100 years, that UAP are more likely to be truly unexplained under current scientific understandings, particularly when

diverse authors/sources share many of the same features of anomalous experience in common (Evans-Wentz, 1911). The logic is that all sorts of different people wouldn't make an error in the same way, unless we can identify a common known cause among them, such as being asleep. After identifying a small subset of the original documents that come from diverse clusters in terms of authorship, I use a combination of manual and large language model (LLM) methods to identify whether key characteristics, such as being asleep or experiencing time slowing, are different for documents in author diverse as opposed to author uniform clusters.

It also is worth noting that my approach begins with a large set of recorded experiences that were viewed as anomalous when they were recorded. One might also define UAP as only those experiences for which scientists agree there is no current explanation, but many scientists, and likely a consensus of the scientific community, would not agree that there are any such experiences. Stretching a bit further, one might define UAP as those experiences for which science cannot in principle find any explanation because the experiences derive from underlying realities that transcend our understanding of causation itself. For this study I adopted the first meaning of UAP/anomalous – that the event was experienced or recorded as such at the time it was recorded.

### **The Ontology and Epistemology of Citizen Anomalistic Research**

Anthropologists frequently distinguish between ontology and epistemology, even while recognizing that these categories overlap and interact. Ontology means any group of people's theory of reality (to include potential realities); whereas, epistemology is a theory of knowledge, i.e. the process by which one comes to know reality. It is worth noting that these words are used somewhat differently in other disciplines. Particularly, ontology is used with a different meaning by philosophers and yet another meaning by computer scientists, but I think the anthropological senses of these words are instructive to clarify certain perennial issues in the study of UAP.

### **THE ONTOLOGY OF UAP**

The ontology of UAP can involve many proposed realities. Many professional scientists focus on the potential for phenomena that are things scientists already agree exist (i.e. they are well accepted in consensus scientific

ontology) as a potential cause of UAP. In this category would be cases of mistaken identity (weather balloons) and also undisclosed but wholly terrestrial technologies created by the U.S. Department of War or other defense agencies.

Some professional scientists will get a bit more exotic and consider ontological possibilities that are still within our known laws of physics and biology, but that propose an extraterrestrial origin for UAP. Research by former director of the All-Domain Anomaly Resolution Office (AARO), Dr. Sean Kirkpatrick, and Harvard astrophysicist, Dr. Avi Loeb, fall into this category (Loeb & Kirkpatrick, 2023). Working within this ontology, Kirkpatrick and Loeb modeled how biological extraterrestrials, constrained by the speed of light and plausible limits on biological lifespans, might still use robotic probes to survey distant planets like our own. Dr. Loeb is in the midst of an ongoing attempt to use systematically deployed and continuously operating optical and other sensors to find evidence of UAP even when no human witnesses are present (<https://projects.iq.harvard.edu/galileo/activities>).

These ontological theories for UAP are at odds, however, with the cultural experience of UAP by U.S. and global citizens who are not professional scientists. The explanation of UAP being caused by extraterrestrials who operate within our known physical constraints would not explain the global, repeated, and long duration of UAP experiences. Either these experiences are cases of mistaken identity (i.e. they are reducible to known phenomena but were unidentified at the time of the experience), or they are caused by something yet unknown to science, but it is improbable they could be caused by extraterrestrials with technology whose fundamentals are already known to our species. It simply is very improbable that extraterrestrials using any technology known to us could maintain such a frequency of contact while also avoiding leaving behind indisputable physical evidence of their existence.

This leads us to why the UAP skepticism of the professional scientific community does not convince citizen UAP believers; there is not just a disagreement between these groups about evidence, but there is a disagreement about ontology (their theories of reality/potential reality differ). The citizen UAP movement is interlinked with the broad ancient aliens phenomenon because extraterrestrials as a cause of UAP become much more logically coherent if one accepts the possibility of ongoing (including ancient) alien contact by extraterrestrials with technology that transcends our known laws of physics and biology. Scientists

like Drs. Kirkpatrick and Loeb are looking for definitive physical evidence of UAP as a space craft as we understand that with our current science, but the hypotheses of UAP citizen researchers specify that the UAP are generated by technologies that radically transcend our understanding. Thus, the null findings of the professional scientific community are not compelling to UAP citizen researchers. A scientist might argue that ideas ought to be judged false when scientific epistemology cannot provide evidence for them, but of course, philosophically it is strange to assert that humanity's ability to know things at any specific point in history defines the reality around us. Human ability to know clearly is constrained, and although our abilities to know have increased over history, at any point in history, scientists could have asserted things that are well known now did not exist because they, at their time, were unable to know them.

The clear cumulative nature of science involves an important caveat about methods, which is that the many books debunking anomalies clearly engage in a valid activity and form of evidence, but it is not scientific evidence. By debunking I mean examining particular anomalistic instances and then determining (after the fact) whether a cause within science's current knowledge *could* explain it. I do not dispute debunking efforts are evidence and are useful. I particularly recommend Aubeck's *Letters of the Damned* (2024) as a good example of a useful debunking study of Charles Fort's correspondences with the popular press (Fort is discussed in detail below). Fort, however, particularly in his first book, which stuck closest to scientific rather than popular publications, correctly specified how debunking is an epistemic error when done in formal science. Among his many examples, a particularly noteworthy one is his accurate accounting of the controversy that surrounded the planet Vulcan, which was hypothesized to exist in 1859 by mathematical astronomer Urbain Le Verrier in order to explain orbital anomalies of the planet Mercury (Fort, 1919). Le Verrier provided exact calculations for the distance, mass, and location of Vulcan, whose gravity pulling on Mercury would explain deviations in Mercury's orbit from Newtonian expectations that had been known for decades. Le Verrier applied the same method to deviations in the orbit of Uranus in 1846, and Neptune was consequently discovered in a single night by German astronomer Johann Galle once Le Verrier had provided exact coordinates where to point the telescope (Fontenrose, 1973; Kent, 2011). However, while Vulcan was a good debunking of Mercury's anomalies in that it *could* explain them even

precisely and mathematically, in fact it *doesn't* explain Mercury's anomalies, because there is no planet Vulcan. Mercury's anomalistic orbit remained unexplained for decades, until Albert Einstein in 1915 demonstrated that his theory of general relativity precisely predicted the orbit of Mercury. Mercury is moving so fast and under such strong gravitational force that from the vantage point of Earth it does not precede through space-time in the same way (Rzetelny, 2015).

Most of the time, science finds itself in Neptune situations – we just need some additional observation or better measurement – and anomalies can be explained through reference to already known consensus reality. But sometimes that's not the case. Sometimes anomalies can only be explained after we revise our view of consensus reality (Natarajan, 2017). Science proceeds by generating predictions ahead of time that are tested with systematic observations (controlled experiments being one powerful form of this). Just establishing that known causes could explain any particular anomaly isn't enough, and Fort resoundingly called out such behavior by scientists are merely a new form of dogma akin to past theologies.

The point of revisiting Vulcan is because it highlights that hypotheses can be tested only if they are put forward, and current scientific consensus is just one ontological frame for posing hypotheses. Yes, the scientific consensus is the best bet at Vegas 6 days from Sunday, but once in a while it still is going to be incorrect, and we need to consider other ontologies. The ancient aliens concept is one such alternative (to scientific consensus) ontology that, even if false, still generates hypotheses and is internally coherent. The ancient aliens concept eliminates an otherwise deeply problematic improbability in alien contact theories that, even if the probability of life beyond Earth is likely close to 100%, the probability of aliens initiating first contact with Earth during any particular moment seems fantastically small. The ancient aliens ontology eliminates this improbability by asserting highly advanced aliens actually always have been in contact with Earth.

Undoubtedly one of the most important print influences that has spread this ontology in recent decades is Erich von Däniken's *Chariots of the Gods* book (first published 1968), which as Aubeck (2022) points out has sold over 63 million copies in 32 languages (Aubeck, 2022, p. 277). Aubeck (2022) helpfully notes several authors who likely influenced von Däniken directly, among them being Pauwels and Bergier's *Morning of the Magicians* book (first published 1960). Colavito (2004, 2012) maintains that Magicians

was a primary influence on von Däniken, but according to Aubeck it was just one of many. In particular Aubeck points to an 1823 book by Francois Charbrier as likely the earliest ancient aliens motif to gain traction when its claims were repeated widely in popular press of the time (Aubeck, 2022, pp. 277–282).

Within the mix of this intellectual history, I think it is particularly fruitful for understanding the ontological implications of ancient aliens by exploring in more detail the science fiction of Howard P. Lovecraft (1890-1937), who Pauwels and Bergier cite as among their influences for their own development of the ancient aliens motif (Pauwels & Bergier, 2009, pp. 131, 302). Lovecraft possessed deep interest and engagement as a citizen involved in astronomy (Sleigh, 2016). Lovecraft was not the first person to set Earthly interaction with extra-terrestrials into the past (Aubeck, 2022), but he had a particular influence on the historical development of this ideas as a popular phenomenon in paranormalist culture (Colavito, 2004, 2012). Many of Lovecraft's stories feature alien species that had come to Earth before the evolution of humanity, and the vestiges of their presence become anomalies encountered by anthropological investigators like antiquarians and archeologists.

Some have suggested that Lovecraft originally got the idea of ancient aliens from Charles Hoy Fort (Pauwels & Bergier, 2009, p. 131). Charles Hoy Fort (1874-1932) was at first a journalist who then became perhaps the first writer to monetize paranormalist speculative nonfiction. Regarding ancient aliens, it is more likely that Fort was but one influence among others on Lovecraft's later fiction (Haden, 2024). This is because Lovecraft cites Fort only once, in the story "The Whisperer in Darkness", and letters by Lovecraft seem to indicate that he had read Fort only shortly before penning *Whisperer* in 1930. Lovecraft's arguable masterwork, "The Call of Cthulhu", clearly referenced the ancient aliens concept and was composed in 1926, but ancient alien contact appears most strongly in some of Lovecraft's later work, such as his novella *At the Mountains of Madness* (written 1931).

H.P. Lovecraft is a central influence in the development of modern science fiction and speculative science of the paranormal. In his stories he develops not just the ancient aliens concept but also articulates body snatching/mind swapping ("The Thing on the Doorstep", "The Shadow out of Time", alien abduction ("Whisperer"), travel between dimensions ("The Dreams in the Witch House"), and artificial intelligence (*At the Mountains of Madness*) in ways that would not become commonplace for several decades later

(Klinger, 2014). A testament to the compelling quality of his fiction, at one point Lovecraft appeared to lament that his fictions were too compelling because readers sometimes confused his contrivances with the truth-seeking of paranormalists like Fort (Colavito, 2004). His influence should not be mistaken with popularity – Lovecraft was known during his life to a relatively small following of readers of pulp weird fiction magazines. He died poor, separated from his wife, without children, and with no estate to inherit his writings. He became influential posthumously when other writers like August Derleth published and popularized his work.

Even though Lovecraft overtly wanted to write fiction, a close reading of his later works reveals that he too may have been captured by his own ideas and begun to speculate as to whether they might be possible. I base this conjecture on several lines of evidence. Firstly, Lovecraft was a notorious racist. "Herbert West: Reanimator" (1921-1922) was a serialized parody of Mary Shelly's *Frankenstein* and expressed deeply racist tropes against Black Americans. Lovecraft was briefly married to a Jewish woman, Sonia Greene (Lovecraft) Davis, whom he expressed was brought into the fold of America only by virtue of his marrying her. Antisemitic and loathing nonwhites and immigrants generally, Lovecraft hated the brief time he spent living with Sonia in the Red Hook section of Brooklyn, and from this experience penned another racist and anti-immigrant story "The Horror at Red Hook" (1927).

However, two of Lovecraft's last works exhibit sympathy for the religious symbolism and superstition of Southern and Eastern European Catholic/Orthodox Christians who were among the groups he despised. In "The Dreams in the Witch House" and "The Haunter of the Dark", Catholic/Orthodox superstitious practices lead to both awareness and adaptive avoidance of dark entities. In all his prior stories, immigrant engagement of any sort with the occult was negative, and usually involved them being deranged cultists. One explanation for this unique pattern of his very late stories might be that he began to suspect some superstitions could be of real value, perhaps if not all dark entities were wholly imaginary.

Related, "Witch House" (written 1932, published 1933) appears to be Lovecraft's only story in which he speculates a rational mechanism for the supernatural phenomena in one of his stories. Throughout his corpus, Lovecraft generally offered few science-based mechanisms for how his otherworldly entities acted, but in "Witch House," he accurately cites contemporary mathematical theories for the

proposed mechanism of dimensions to reality that exist outside of conventional space-time (note 12 on page 648 and note 13 on page 650 of Klinger, 2014). Again, the timing is suggestive of a late-developed interest by Lovecraft in whether and how his imagined entities might or could actually work.

Such late developments for Lovecraft are in fact sensible in terms of his personal biography in that across his corpus Lovecraft displays a detailed knowledge of Christianity and Western occult traditions. For example, “The Dunwich Horror” is essentially a parody of the Gospel account of Christ. In “The Haunter of the Dark”, he refers to the *Book of Dzyan*, which is an unverified text that the founder of Theosophy, Madame Blavatsky, claimed to have read while in Tibet (note 14 on page 790 of Klinger). The point is that yes, Lovecraft is accurately regarded as the atheist he publicly and consciously avowed to be, but certainly he was an unusually broadly inquisitive one to have read all this religious, spiritual, and occult content.

Even more importantly, conceiving Lovecraft’s fictions as potentially real is meta-consistent with Lovecraft’s self-declared philosophy of cosmicism, which paradoxically logically undermines Lovecraft’s materialism. In his cosmicism, Lovecraft asserted that the material cosmos was vast beyond human comprehension and also that this vast incomprehensibility implies the cosmos is morally indifferent to human existence. He grounded cosmicism with the fact that human intellect itself evolved in a particular time and place through Darwinian evolution. This observation leads to the logical conclusion that there ought to be realities in the cosmos that transcend humanity’s comprehension, and even comprehension via our scientific methods. Darwin himself also made this observation in a letter that when contemplating abstract philosophical and theological questions (he was writing specifically about whether evolution contained any purpose), he had the “horrid doubt” that because our minds evolved from lower organisms and for particular adaptive purposes that were disconnected from abstract philosophizing, that we ought not trust any of our conclusions on such matters (Matthews & Robertson, 2024). Paradoxically, but perhaps logically, Lovecraft extends this reasoning through his fiction to suggest that extraterrestrial and/or interdimensional beings could exist, could interact with our world, but because they exist outside the forces that evolved our own minds, they are fundamentally incomprehensible to us and even to human science. Thus, regardless of how Lovecraft intended his work at various points in his life, his fictional linkage of prehistory with extraterrestrial

encounters is one of the more robustly developed ontologies for why ancient aliens might exist even when current science has difficulty demonstrating their existence. It is this ontology of ancient and transcendent aliens that makes searching for truly new information (not just mistaken identity) in UAP encounters logical.

## The Epistemology of UAP

While Lovecraft is a central figure to the development of the ontology of ancient aliens and UFO subculture, Charles Fort’s methods of amassing thousands of notes became the epistemic model for a great deal of future citizen science of the paranormal. Fort was not a fiction author, but possibly the first author to monetize highly speculative paranormalist nonfiction. He wrote four works of speculative nonfiction in the early 20th century. Like Lovecraft, Fort engaged in citizen astronomy (Steinmeyer, 2008). His wife expressed how he knew a great deal about the stars and spent hours studying them. Fort developed deep misgivings about professional science that he incorporated into his four books on anomalies. He used the ancient aliens motif in his first book to solve the Fermi paradox, which he anticipated prior to Fermi. Fort asked essentially, why have we received no alien contact? His answer was that this likely is because it already happened long ago, and now we and our planet are, unknown to us, already the property of some alien species that warns everyone else off (Fort, 1919). Fort combined these speculations in his books with hundreds of observations of anomalistic sightings akin to UFOs, as well as falls from the sky of strange objects like frogs, fish, and stones, and reports psychic phenomena like telekinesis. His book *Wild Talents* (published 1932) is among the first articulations that psi might account for poltergeist experiences (Fort, 1974).

Fort was famous not just for his books, but for the vast collection of paper notes he constructed while researching them. Fort conducted most of his research at the New York Public Library and at the British Museum. The notes were preserved by Tiffany Thayer and are housed today at the New York Public Library. Thayer made money working in advertising and writing pulp (some might argue smut) fiction (Nichols, 1956; Norris, 2013), but regardless of how one regards Thayer’s writing, he appears to have been rigorously devoted to the preservation of Fort’s notes (Sleigh, 2016). Most of Fort’s notes are abbreviated citations to scientific journals, but some are extended notes written by Fort about the contents of a given article (Figure 1).

Fort folded and paperclipped these extended notes together so that they would be the same size (roughly 1.5 by 2.5 inches) as the citation types of notes. In some cases, these still are paperclipped together within the archive, while in other cases the clipped together notes have been carefully segregated with paper envelopes and cards to indicate how Fort had arranged them (Figure 2).

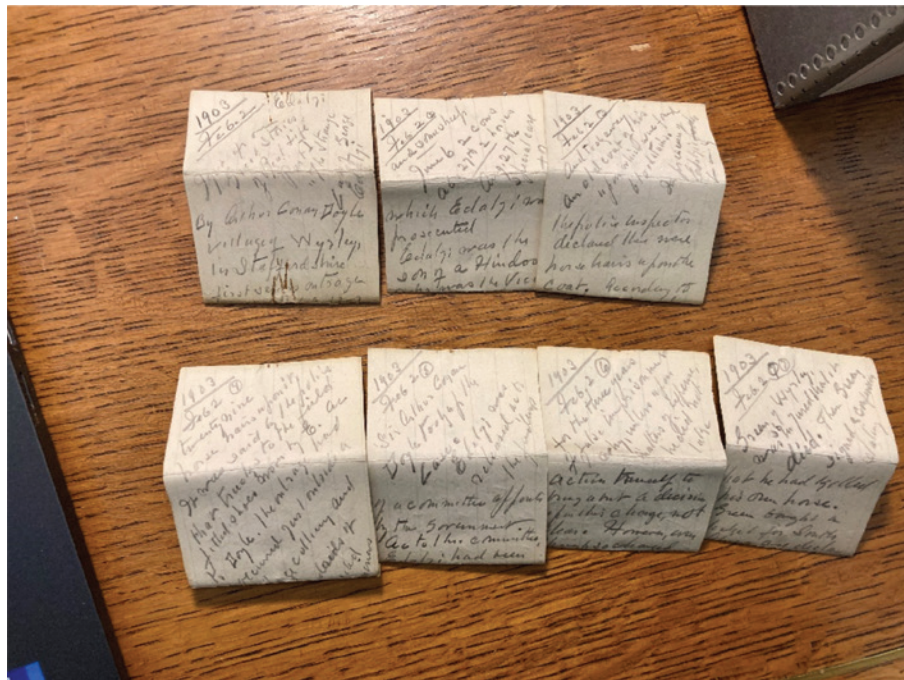
A few cards provide even more direct evidence about Thayer’s archiving process and that he was the person behind it. Figure 3 shows a note about the archiving process signed T.T. (undoubtedly Tiffany Thayer) and another card indicating where “Kathleen” began transcription. Thayer’s last wife was named Kathleen McMahan (Genealogy Traits History Group, accessed 12/30/2024), and the “transcription” would appear to be a reference to Thayer’s ongoing project to publish all of Fort’s original notes in issues of the Fortean Society Magazine, *Doubt*.

Thayer published many of Fort’s original notes in *Doubt*. *Doubt* became an outlet for the ideas of Thayer and others, and it took Fort’s use of anomalies in a more conspiratorial direction (Sleigh, 2016; Steinmeyer, 2008). Although this may not have been Fort’s intent, I would reiterate that the best scholarly work takes on a life of its own. It is true that *Doubt* published outlandish conspiracy theories that anticipate our current problem with misinformation ranging from vaccine-to election-denialism. *Doubt* published these ideas, however, in the context of documenting

real scientific anomalies and while advancing ideas that were radical at the time, such as anti-vivisectionism and anti-fascism, that now are regarded as the norm.

*Doubt* published the notes in their original form and order, but I propose this does not fully convey the way Fort likely used the notes. To reiterate, Fort’s notes are written on literally thousands of slips of paper, either cut or folded to about 2 inches on a side. The boxes appear to be kept in their original order (mostly chronological by publication source date) when I reviewed them at the New York Public Library in March 2024. The order of notes in the boxes conforms to that in the published version of them in *Doubt* and on Mr. X’s website (described in more detail below) and is almost completely chronological by publication date. I believe the order of notes in the boxes is how Fort happened to leave them when he died, and that his use of the notes was actually as a form of paper-based relational database. I propose this because a minority of the notes are organized by subject. Fort spent countless hours not just making the notes, but organizing and reading through them. As I poured over these notes, I found myself wondering: why did Fort not use a notebook like normal researchers? It seemed highly inconvenient to write citations, but especially long textual notes on these tiny slips of paper.

I think Fort may not merely have been eccentric in his note-taking habit. I think he was keeping the cards ordered by year as a default but then grouping them into topical



**Figure 1.** Example of an Extended Handwritten Note of Charles Fort.

categories as part of his writing process for the books. The thematic grouping of a small minority of notes that remains is merely the last grouping he had made at the time he passed on, and under my thesis, he would have had

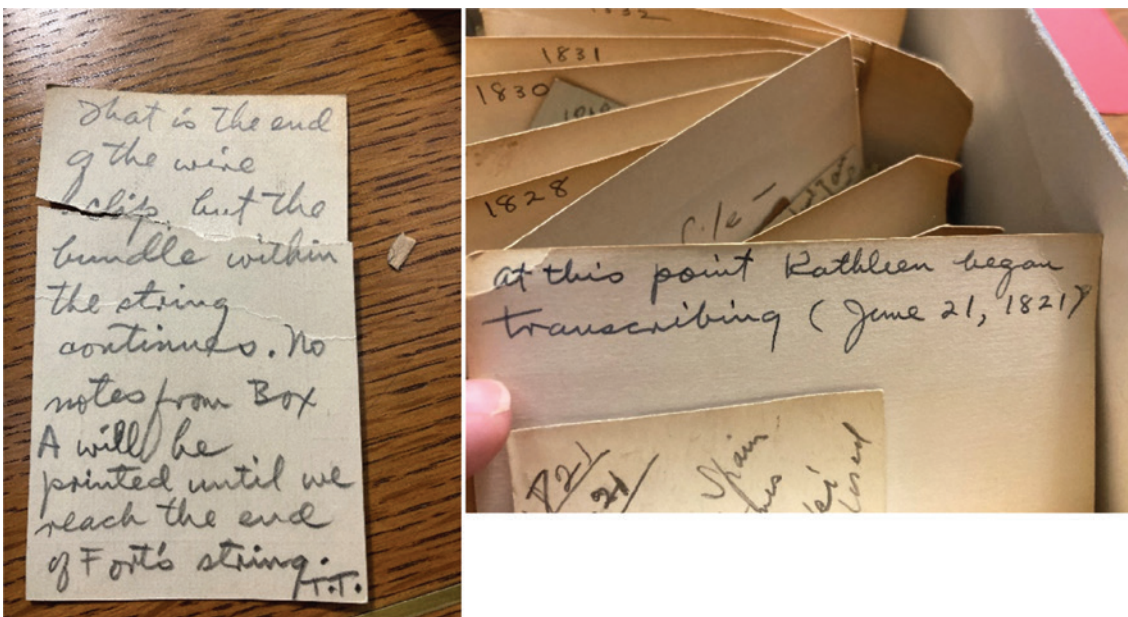
many other different groupings while writing his books. Although using cards as an organizational tool for writing would not have been an innovation by Fort, the sheer massive scale at which he did this becomes akin to what is today done with a computerized database rather than akin to a typical writer's process. Further evidence of Fort's notes comprising a paperclipped database includes a few notes in which Fort records for himself instances in which he used the color of the note papers to indicate the topic, source, or other features of the note. I had noticed the faded varying colors of the notes during my time at the NYPL, but I thought the paper colors were merely happenstance as to what paper Fort had in his possession at the time. I appreciate Mr. X for pointing out to me (after my NYPL fieldwork) that Fort's own notes suggest the paper colors were meaningful to him. For example,

1800 / Notes / Order / Blue / Mauve / Pink / Light Yellow / Yellow / Green / Salmon / Lavender / Gray / from May 16, 1923 / Lighter green / Dark blue / White / Jan. 15, 1931 = light salmon.

N / From May 16, 1923 / Blue / Mauve / Pink / Light Yellow / Yellow / Green / Salmon / Lavender / Gray / Lighter (this) green / Blue. From Nov, 1928 = white / Jan 15, 1931 = pale salmon / July 1, 1931 = white ruled.



**Figure 2.** Fort's Paperclipping of Notes Preserved with Envelopes and Index Cards in the NYPL Archive.



**Figure 3.** Evidence of Tiffany Thayer and Kathleen McMahon(?) Active in Archiving Fort's Notes.

It would take another effort with the original notes to ascertain how systematically the paper colors are indexical, but if they are, then this would point to a clear means by which Fort used his notes as a true database, because he could have pulled collections of notes by date and by color.

Fort may be the first ever citizen scientist to pursue scientific knowledge via the massive accumulation and organization of data that were collected poorly in terms of scientific method. The data collection itself is poor in the sense that the anomalies Fort collected, although almost entirely from reputable scientific and journalist sources, are derived from every conceivable research method, study site, and sample size. They are a monstrous collage of information. This continues to be a challenge for the interface of citizen and professional science; citizen scientists tend to be inclusive about data collection and unconcerned about methodology, whereas professional scientists tend to exclude any observations not collected according to their understanding of the best practices for a given study system (Chari et al., 2017, 2019). Regardless of how professional scientists even today view these haphazard citizen science databases, Charles Fort essentially set the epistemological paradigm for how citizen researchers would seek to generate knowledge about UAP for the next 100 years and continuing to the present.

### Modern Anomalies Databases

Fort's inclusively massive approach to collecting data deeply influenced the history of paranormal citizen science. Much of that influence in the study of unidentified flying objects (UFO), now termed more inclusively as unidentified anomalous phenomena (UAP), was channeled through famed UAP investigator Jacque Vallee. Vallee cites Fort as among his influences in his first book, *Passport to Magonia* (Vallee, 1969). The appendix of *Magonia* emulates Fort's notes (not Fort's books) by presenting hundreds of very short accounts of UAP experiences.

All of Fort's notes, or Vallee's appendix, were written by their respective author even when derived from other sources. With the advent of the internet, this type of data collection by inclusive massing could be done more directly. Thus, databases like that of NUFORC are new instantiations of much the same idea as Vallee's *Magonia* appendix, but the experiences are reported into the database directly by the experiencers.

A Ph.D.-trained computer scientist, databases influenced not only how Vallee approached the study of UAP,

but also influenced his consideration of the ontological possibilities implied by UAP. In his 1988 book, *Dimensions*, (Vallee, 1988) Vallee speculates that UAP experiences may be transient views behind the veil of our ordinary reality, and that there might exist a different, more base-reality that is information-based, he specifies, like a relational database, rather than space-time-based. Space-time, according to this hypothesis, is a contingent reality or even a mere appearance of reality grounded entirely in a transcendently different base-reality that is more about accessing varying information states. Vallee's view in *Dimensions* thus anticipates current speculative reasoning about our experienced reality being a simulation that is created by an alternate base-reality. I also note that both Vallee's view and the simulation view accord with traditional theistic speculations that a more fundamental base-reality (God in the Abrahamic faiths) created our experienced reality as something entirely dependent on base-reality yet also wholly different in important ways. The suspicion that base-reality differs from our experienced reality might also explain repeatable results from parapsychology, and various experiences of transcendence by a great variety of spiritual seekers (Horowitz, 2020).

A separate stream of anomalistic experience research feeds directly into Vallee's synthesis, which is the study of fairy folklore and experiences. The central thesis of Vallee's work is that whatever modern UAP encounters are (and Vallee asserts that he still doesn't know) (Tattoli, 2022) they are the same underlying phenomenon as encompassed by encounters with fairies, known variously as little folk, elves, pixies, leprechauns, trolls, etc. One early study of fairy encounters in the modern period is Evans-Wentz book, *The Fairy Faith in Celtic Countries* (1911), which is cited extensively by Vallee (Evans-Wentz, 1911). Evans-Wentz's book is more of a folklore study in that many of the reported experiences are passed-down second-hand accounts, but similar to the evolution of UAP databases from Fortean, fairy encounters first compiled by Evans-Wentz are today collected by scholars as masses of experiencers' own first-hand accounts. The most comprehensive of these is *Fairy Census* by Simon Young (*Fairy Census, 2014-2017*, 2018).

### The Current Paper

The current paper engages this history by at least entertaining the ontology of paranormal citizen scientists, which means taking their ideas seriously as hypotheses. Granted, I am interested as well in the social processes involved in why they believe what they believe, irrespective of the

truth-value of the ideas. Focus on the social processes that generate ideas is the phenomenological approach to anthropological inquiry. I think the above history shows that an ontological approach is justified in addition to, and in complement of, phenomenological approaches. The reason is that the history just summarized shows that, although paranormal citizen science exists in a liminal space that engages literary fiction, and is not conducting research the way professional science does, it still comes from a substantial tradition of scholarly thought. In the phenomenological approach, we ask why individuals believe/act/experience as they do and often seek functionalist explanations for these things, but rarely do we put on the table the possibility that they believe as they do because they have potential evidence for their beliefs.

My central research hypothesis derives from Vallee: *that there exists some core anomalous experience that underlies at least a minority of cases from across diverse datasets of the anomalous*. This hypothesis was also articulated by Evans-Wentz when he cites psychical researcher Andrew Lang:

*But that ignorant modern knaves should feign precisely the same raps, lights, and movements as the most remote and unsophisticated barbarians, and as the educated Platonists of the fourth century after Christ, and that many of the other phenomena should be identical in each case, is certainly noteworthy.* (Lang 1896 as quoted by Evans-Wentz, 1911)

The current study seeks to identify through quantitative lexical analysis, **1**. Whether there is a core anomalous experience among diverse experienter reports, **2**. The frequency of this core experience relative to the total set of experiences, and **3**. The most uniquely identifying features or combination of features of the core experience. This last point begins to get at causation in that experiences of being recently asleep might be related to processes known to science to generate the experience of anomalousness.

Vallee approached this same hypothesis through a qualitative analysis of the many experiences he documented in *Magonia*. The trouble with the qualitative approach, as employed by Vallee, is that it is highly susceptible to the perspective and biases of the qualitative interpreter of data. Vallee did not employ any tests of inter-rater reliability, as would cognitive anthropologists, to guard against his own prior beliefs coloring his analysis (Bernard, 2018). The analysis in *Magonia* and *Dimensions* is distinctively Vallee's analysis, and we do not know if others who read through the same data without

his narrative would arrive at similar conclusions vis-a-vis linking UAP and fairy experiences. All this having been said, I do find Vallee's analysis highly compelling.

As a complement to qualitative approaches, I conducted a quantitative lexical cluster analysis of the four anomalies texts that each are collected separately from the others. I sought to identify any statistically robust clusters that grouped documents together from across the different original texts. Such clusters, even if they include only a minority of documents, should provide key insights into the features of the core anomalous experience because they would be coming from diverse authors and from distinct anomalistic genres (e.g. UAPs versus fairies). Based on authorship and genre influences, documents should cluster quantitatively by shared authorship and/or genre. Cluster analysis of documents in this manner to identify authorship has a long history of application when authorship is unknown or uncertain, including reconstruction of the original source documents of *Canterbury Tales* most directly attributable to Chaucer (Barbrook et al., 1998), inference of the authorship origins for orally transmitted folktales like Little Red Riding Hood (Tehrani, 2013), identification of likely plagiarism (Stamatatos et al., 2016), and identification of authorship of terrorist documents (Abbasi & Chen, 2005). Thus, I fully expected many of the documents, and even most of them, to cluster by the author/source in my analysis, as this is a known property of the outputs cluster analysis applied in this way. My logic followed Evans-Wentz and Vallee that the documents (likely a minority) that group across these authors/sources in a statistically robust way might do so because they share core features about the anomalous experience in common despite their divergent authorship and genre.

In parallel to identifying clusters of documents with shared authors, I applied a large language model (LLM) to classify each document as having (or not having) specific thematic elements. I developed themes from my read of a handful of documents in each dataset and based largely on the classificatory schemas presented by Vallee in books, *Passport to Magonia* and *Dimensions*, and that were subsequently present in the NUFORC and *Fairy Census* structured data. Both of the latter included structured survey items such as whether the experienter was recently asleep, whether they saw humanoids, etc., but these were defined variously and seemed often not completed by respondents when I manually reviewed the textual entries. Thus, by applying my own manual coding and LLM, I was able at least to apply a consistent coding of these themes that are

discussed among a consensus of published experts (Vallee, NUFORC, *Fairy Census*). Importantly, the clustering of documents and the LLM theme coding were completely independent. The cluster analysis did not use any output from the theme coding as its input, nor did the theme coding use as inputs anything from the cluster analysis nor was it given any information directly about the author/source of each document. It also is important to note that while the theme coding relies on the training data that OpenAI used to create GPT4 (which is widely believed to be the whole scrapable internet), my implementation of clustering in this case has no training data, nor does it rely on any lexical information about English. My application of clustering used only the information present in the documents I selected for the analysis. Thus, my clustering is a wholly exploratory analysis technique that describes the structure of the documents.

I also note that I remained open in this test to the possibility that known scientific causes, like having been asleep, might account for the core anomalous experience of documents in high author/source diversity clusters. My inclusion criterion for documents was that they were experienced as anomalous at the time, and certainly most mainstream scientists would expect some known causal factor to explain when diverse sources share experiences of the anomalous.

This enabled me to conduct a final verification test of whether the themes, originally intuited by Vallee and coded by an LLM, correlated with authorship diversity. A strong correlation suggests a given theme is indeed part of the core anomalous experience, because it presents itself more in clusters that are groups from diverse authors rather than from single authors. Again, the rationale is that agreement among diverse authors/sources is indicative of a shared common experience. Indeed, at the extreme end of shared experience, we arguably have a method that approaches science, because science proceeds by independent observers observing the same things. What I mean is the ultimate backstop for truth in science is not peer review, not preregistration, but that independent observers can go out, and all on their own replicate the observations reported by others. The more UAP observers can demonstrate this same property about their observations, the more it approaches science.

## METHODS

### Datasets

1. Fort's notes: This study used the notes of Charles Fort as published by Mr. X on his website ([http://](http://www.resologist.net/notes/index.html)

[www.resologist.net/notes/index.html](http://www.resologist.net/notes/index.html)). Mr. X helpfully compiled and published several transcriptions of Fort's notes that were conducted, beginning with Thayer's transcriptions into *Doubt*. Although it is impossible to fully verify the transcriptions, spot-checking during my own perusal of the original notes in the archive appears to indicate they match. Similarly, spot checking of Mr. X's published notes matches the subset notes Thayer transcribed and published in *Doubt*.

2. Vallee's *Passport to Magonia* Appendix: The appendix of Vallee's groundbreaking book on the UAP phenomenon includes a set of hundreds of short accounts of experiences investigated and by Vallee. He cites both Fort and Evans-Wentz as among his chief inspirations for undertaking his project.
3. *Fairy Census*: Another project that takes inspiration from Evans-Wentz is Simon Young's *Fairy Census*, which consisted of an online survey where people could enter their experiences of fairy encounters
4. NUFORC UFO highlighted accounts: Similar to *Fairy Census*, NUFORC maintains an online web survey where people can report their experiences of UAPs (<https://nuforc.org/>). We used accounts thought credible by NUFORC personnel (highlighted in the data) because this excludes accounts that might be transparently hoaxes, and to include more potentially interesting cases. All the datasets thus involve an attempt to remove hoaxes, but Fort's notes, *Magonia*, and NUFORC also involve some effort to include more interesting or informative cases. Only *Fairy Census* accepted any case with no other filter, so long as it was not obviously a hoax (Simon Young pers. comm.).

## Analyses

### Cluster Analysis (a.k.a. Topic Modeling)

I analyzed the combined data from four data sources using a text analysis pipeline going from the original data through to a fitted nonhierarchical topic model. This model ultimately divided the documents among a set of clusters such that documents were grouped in the same cluster because they shared similar proportions of topics. These

analyses are preliminary. I am unaware of any prior study that has combined citizen anomaly data in this way and applied exploratory machine learning tools to them. I hope, however, to have laid out the methods in sufficient detail that future replication studies could apply them to other anomalies databases. Many more exist, such as the data from MUFON (Mutual UFO Network, <https://mufon.com/>) or from the now-closed UFO email and phone hotline run by the Bigelow-funded National Institute for Discovery Science (NIDSci) (<http://www.ufoevidence.org/documents/doc1200.htm>).

The first step was to find a cutoff of document length that would eliminate the notes of Fort that were mere citation information to journals. Fort mixed citation notes and descriptive notes together in his boxes. I used the median character length of a Fort note (74 characters) as a cutoff and proceeded to manually review a random 100 notes over this cutoff and a random 100 notes that were less than or equal to it. Of the notes over the median that I reviewed, 72% included description of the anomaly whereas of the notes equal to or less than the median only 13% included descriptive information (the rest were citations). Thus, the median Fortean note length presented a reasonable enrichment of descriptive relative to citations notes, and I therefore applied it to the whole dataset as a cutoff.

I then stemmed the words (e.g. “keeping” and “kept” become “keep”) and removed English stop words (e.g. a, the, in, of) using the `quanteda` package in the software R (Benoit et al., 2018). While these steps are not always conducted in lexical analysis, in this case I deemed them desirable because I was trying to find similarity among a highly diverse set of documents from different authors and genres. I did not want clusters to be assigned simply because some document sources used the present or past tense more frequently.

I then took the stemmed words and calculated quantitative weights for them and for adjacent word pairs (bigrams) using a term-frequency-inverse-document-frequency (tfidf) conversion (Manning et al., 2008), function `dfm_tfidf` in the `quanteda` package. The tfidf conversion essentially takes an original matrix that simply counts the number of occurrences of each term in each document, and reweights those occurrences to give higher weights to documents that occur frequently within a specific document but infrequently in the corpus of all documents. This is a very commonly applied method in lexical analyses because it down-weights the importance of words that simply are used extremely frequently, such that their occurrence in

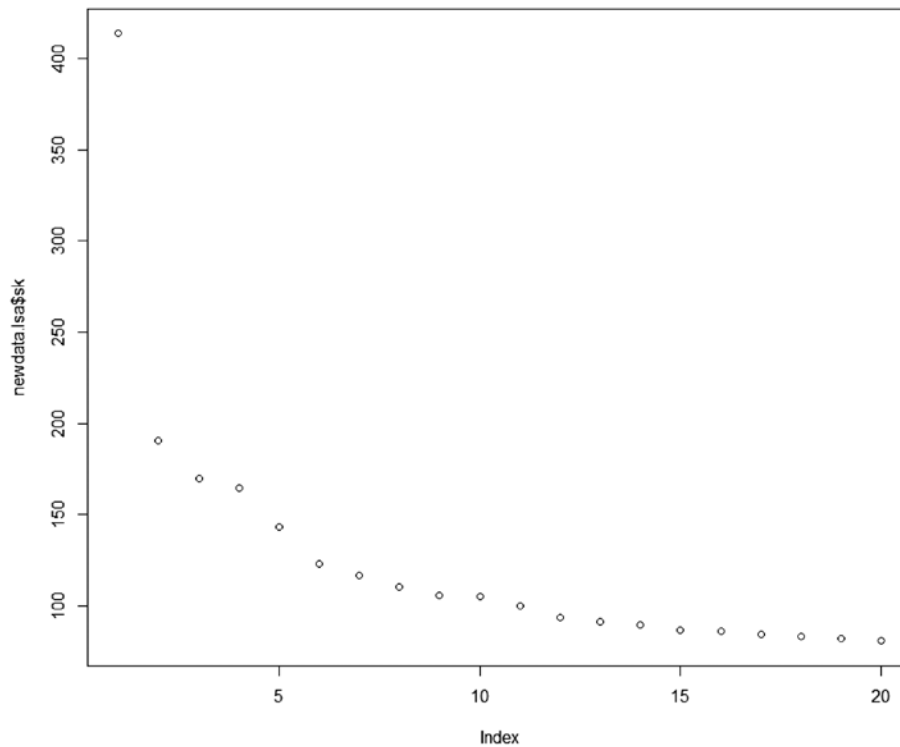
any two documents should not be taken to connote any particular similarity between them. For example, UFO might be such a term in this corpus as a whole – the corpus is about UFOs, so the fact that any document talks about UFOs does not deserve any special regard.

After applying the tfidf conversion, I submitted the document by weighted term matrix to a Latent Semantic Analysis (LSA, R package `quanteda.textmodels` function `textmodel.lsa`), which essentially is a special form of Factor Analysis for lexical data (Deerwester et al., 1990; Rosario, 2000). LSA seeks to express the variation in the original tfidf matrix on a minimum number of quantitative axes of variation that are synthetic continuous measures outputted by the LSA. I tested for up to 20 axes and identified a first step in the model fit after 4 axes (Figure 4). Thus, I used a 4-factor/axis LSA model going forward.

The axes themselves in an LSA are interpreted at “topics”, but documents can be comprised of varying combinations of topics. Thus, I used the 4 LSA axes as the input to a nonhierarchical clustering algorithm (k-median clustering). I searched for 2:30 clusters and applied the Calinski-Habaras (CH) criterion to assess how many clusters were a best fit for the data in that they maximized variance being apportioned between clusters while minimizing variance within clusters (R package `fpc`, function `pamk`) (Hennig, 2024; Kaufman & Rousseeuw, 1990).

Lastly, I applied the Simpson diversity index to the final counts of authors/sources by cluster assignment (R package `vegan`, function `diversity`) (Oksanen et al., 2024; Simpson, 1949). The Simpson diversity index was developed in order to quantify how diverse different locations were in the study of biological species ecology. It seems appropriate to this context under the reasoning that the assigned cluster is analogous to the place of the document, and the author/source is the species. I used the author diversity of each cluster, as measured by the Simpson diversity index, in a set of correlation tests of whether author diversity correlated with the themes that I coded with a large language model.

As a final test of the robustness of the results to including distractor documents, I reran the LSA and cluster analysis while also including documents from a completely different project. These documents were social media posts from across 27 different social media platforms that included group names from either of two lists (Anti-Defamation League, Southern Poverty Law Center). I included the mean number of documents from across all of the four original anomalies author/source as distractors (5711



**Figure 4.** Scree Plot of Singular Value Decomposition (SVD) Values for Each Factor of the LSA Fitted to 20 Total Factors.

documents). I then calculated how well the anomalies documents were grouped into the same clusters as when I conducted the analysis without the distractor documents. I will note this was a highly stringent test, analogous to testing whether a gap analysis can detect 2 different means for height for a sample that includes both men and women and without the analysis being told from how many reference populations the heights were measured.

**Theme Labelling with a Large Language Model**

I labeled each document for the presence/absence of each of 11 themes that I defined based on my reading of Vallee’s books *Dimensions* and *Magonia* and informed by my ad hoc review of a handful of the entries from each dataset. The reason for basing the themes on Vallee’s work was that he is a respected researcher in this space who, based on his own qualitative analysis, has argued these themes reflect aspects of a core anomalous experience that is shared in common across such seemingly diverse forms of folklore as UFO experiences and fairy encounters. Most of the themes I defined also are collected as part of a structured survey component of NUFORC (although it is unclear what percentage of people who submit narrative reports also fill out the structured survey). Likewise, several of the themes I developed overlap with structured survey items that *Fairy Census* collected along with narratives. While I

think there are additional themes to define and study in these data, I thought the triangulation of these published sources suggested that a consensus of experts, to include NUFORC personnel, Jacque Vallee, and Simon Young, would agree with some version of these 11 themes as important because they all effectively have published versions of them in writing.

I applied GPT4.0 32K, June 2024 build, and asked the model to code the themes. This version of GPT was among the most advanced LLM models and trained with some of the largest training sets to date as of Summer 2024. Appendix A shows the prompts that I supplied to GPT to have it code presence/absence of each theme in each document. The results from the cluster analysis had no influence on the theme coding because they were not submitted as inputs to GPT4. Only the text of each document was submitted to GPT4. Similarly, the results of this theme analysis with GPT4 had no influence on the cluster analysis described in detail above. Although GPT4 has an extensive set of training data that undergirds it, and only its creator OpenAI knows for sure what was in those training data, the cluster analysis had no training data and used only the uniquely assembled dataset I supplied to it.

Finally, I selected a random 100 documents from my analysis and manually coded for the presence/absence of



each theme myself and without looking at what the LLM had assigned for those documents. I calculated the inter-rater agreement for each theme between myself and the LLM using Spearman correlations.

## RESULTS

A full comparison of original versus retained documents, using the cutoff greater than Fort’s median character length, is shown in Table 1. This median cutoff was conducted mainly to remove notes that were purely citation information rather than textual descriptions and thereby render the filtered data a more comparable set of brief but reasonably detailed descriptions of experiences.

The cluster analysis produced 20 clusters as the optimal number of clusters that maximized quantitative differences between clusters while minimizing these differences within clusters (as assessed via the Calinski-Habaras criterion) (Table 2). Please keep in mind that the cluster analysis is a wholly untrained and exploratory technique. The LSA followed by clustering did not rely on any prior training data and used only the data submitted in this study. The author/source of documents was not fed into the LSA-cluster analysis pipeline as an input. Also, and in contrast, themes coded by the LLM are based on the LLMs training data (effectively the whole scrapable internet), but I applied the LLM without any influence by the cluster analysis. As with the cluster analysis, I applied the LLM without telling the LLM the author/source of any documents (Figure 5).

As a control test, I reran the clustering process with 5711 distractor documents taken from a modern social media dataset not focused on anomalies. Then for all pairs of the anomalies documents, I calculated whether they were in the same or different cluster when the process included the distractor documents. I compared these strings of 0s and 1s (same/different cluster) to the same strings calculated for the original analysis without the distractor documents. This effectively tests the extent to which anomaly documents were grouped together into similar clusters even in the presence of distractors as a form of control. The

**Table 1.** Document Counts in Original Data Sources and After Removing the “Citation” Notes.

Author/Source	Original Count	Filtered Count
Fairy	500	495
Fort	43532	20771
Magonia	923	917
NUFORC	662	661

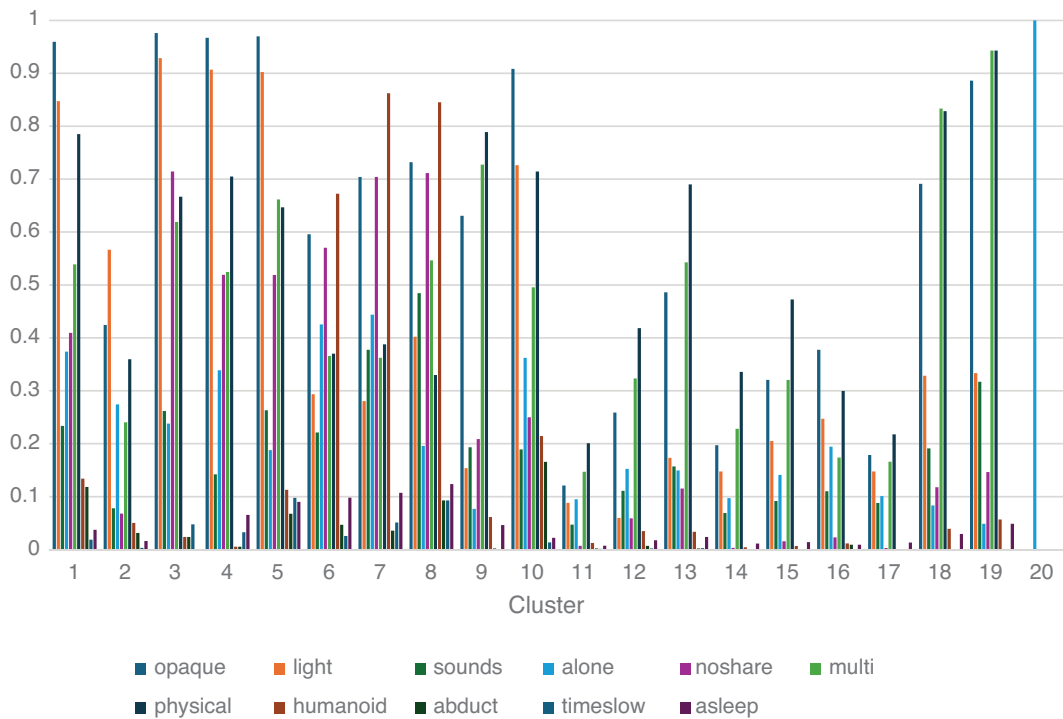
Spearman correlation was 0.23 ( $p < 0.001$ ), which indicates a statistically significant similarity between the clustering of the anomalies documents both with and without the distractors included.

I assessed the correlation of the Simpson diversity index for each cluster with the prevalence of each of the 11 themes (Table 3). While this research is exploratory in nature, there was an *a-priori* hypothesis derived from qualitative work (by Vallee and Evans-Wentz and others) that drove this correlation test. Therefore, I assess p-values with the Bonferroni correction for the multiple testing across the correlations with each theme. Relative to the Bonferroni correction, the p-values could be regarded as a more definitive hypothesis test.

To further test the potential associations, I conducted an additional analysis that increased statistical power by using the individual documents as the data points. Specifically, I tested whether a document being in the most diverse cluster (cluster 1) was associated with the presence or absence of each theme in the document. When conducting this test I also eliminated the documents that were grouped into Fort-only clusters (clusters 17 through 20) because I did not want the test to be confounded by being a contrast of the most diverse cluster merely with Fort-only clusters. I used a Spearman correlation for these

**Table 2.** Author/Source of Documents in Each Cluster.

Cluster	Author/Source Count				Simpson Diversity Index (0-1)
	Fairy	Fort	Magonia	NUFORC	
1	2	23	112	184	0.54
10	6	115	490	65	0.44
6	174	27	2	32	0.42
2	3	1087	212	8	0.29
8	90	0	0	7	0.13
5	4	2	0	127	0.09
7	189	1	0	6	0.07
16	0	428	9	0	0.04
12	7	2002	28	2	0.04
11	20	5201	47	4	0.03
4	0	2	0	181	0.02
13	0	1458	5	2	0.01
15	0	2979	7	0	0.00
9	0	454	0	1	0.00
14	0	4561	5	0	0.00
3	0	0	0	42	0.00
17	0	2103	0	0	0.00
18	0	204	0	0	0.00
19	0	123	0	0	0.00
20	0	1	0	0	0.00



**Figure 5.** Proportions of LLM-Coded Themes in Each Cluster.

tests, as they were correlations of one binary string, e.g., opaque yes (1) no (0), versus another binary string, diverse cluster 1 yes (1) or no (1). As before, there are 11 correlation tests, and so the Bonferroni corrected p-value for significance is 0.0045. The results show that all the themes except the witness having been asleep are positively associated with a document being placed in the most author diverse cluster (Table 3).

Finally, I selected 100 documents completely at random from the whole set and manually coded these without consulting what the LLM had coded for the themes. This resulted in another set of Spearman correlations function as inter-rater reliability measures between a human (myself) and the LLM. More than half of the themes show substantial chance-corrected agreement, as measured by Spearman correlations, although most are less than the general benchmark of ~0.7 chance corrected agreement as a goal for inter-human coders (Krippendorff, 2004). The full set of correlations are shown in Table 3.

**DISCUSSION**

Charles Fort’s pioneering paperclipped database of anomalies set the pattern for how later citizen scientists would approach the study of anomalistic phenomena like UAPs. This study applied modern lexical analysis tools to test for the presence of clusters of documents with high

similarity in content but also high diversity in authorship or source. This is one index suggested for potential authenticity of anomalous reports for at least 100 years going back to Evans-Wentz’s research on fairy experiences. I then applied a large language model (LLM) in combination with manual review to characterize whether particular themes were more common in the documents grouped into high author/source diversity clusters as compared to documents grouped into clusters with low author/source diversity.

I included in the study the original notes of Fort and Vallee and included two modern citizen-contributed databases built around a similar template, the UFO data from NUFORC and the data of fairy encounters from *Fairy Census*. The first three sources were all more heavily curated in that Fort and Vallee did not record all the data they ever encountered, but only the data they thought were anomalies. Similarly, for NUFORC, I used only the records that NUFORC personnel had reviewed and flagged as more compelling examples of anomalies than most of their reports. The *Fairy Census*, in contrast, was curated only to remove obvious hoaxes (Simon Young, pers. comm.). Additional forms of variation in the data include that Fort’s notes involve a more diverse ensemble of anomalies, such as psi experiences, beyond what would be conceived of as a UFO or fairy experience by respondents to NUFORC or *Fairy Census*. However, part of the purpose of applying



**Table 3.** Correlation Analyses of LLM-coded Themes.

Theme	Correlation Simpson Diversity with Theme Frequency <sup>1</sup>	p-value	Correlation of Theme Presence and Assignment of Document to Highest Diversity Cluster <sup>2</sup>	p-value	Correlation of Theme Presence as Coded by LLM versus as Coded by the Author <sup>3</sup>
opaque	0.36	0.12	<b>0.18</b>	< <b>0.0001</b>	0.36
light	0.43	0.06	<b>0.20</b>	< <b>0.0001</b>	0.58
sounds	0.18	0.45	<b>0.06</b>	< <b>0.0001</b>	0.55
alone	0.27	0.25	<b>0.08</b>	< <b>0.0001</b>	0.25
noshare	0.29	0.22	<b>0.17</b>	< <b>0.0001</b>	-0.03
multi-witness	0.004	0.99	<b>0.07</b>	< <b>0.0001</b>	0.41
physical	0.13	0.58	<b>0.10</b>	< <b>0.0001</b>	0.50
humanoid	0.34	0.14	<b>0.05</b>	< <b>0.0001</b>	1
abduct	<b>0.81</b>	< <b>0.0001</b>	<b>0.12</b>	< <b>0.0001</b>	NA*
timeslow	0.12	0.62	<b>0.03</b>	< <b>0.0001</b>	NA*
asleep	0.23	0.34	0.02	0.005	NA*

Note: Bolded values significant at Bonferroni corrected p-value of 0.0045

1 Pearson correlation, p-values two tailed, N = 20 clusters

2 Spearman correlation, p-values two tailed, N = 20413 documents

3 Spearman correlation from presence(1)/absence(0) coding of a randomly selected 100 documents

\*correlation is not defined because neither the LLM nor the Author identified any occurrences of this theme within the random sample of 100 documents

cluster analysis is to sift out such documents at scale; i.e., these should be placed off in their own Fort authorship clusters. Relatedly, subsequent qualitative analysis has critically reassessed some of the notes of Fort and of Vallee's Magonia (Vallee and Aubeck, 2010). My analysis does not question the value of those qualitative reassessments, but it tries to complement by using algorithmic tools to accomplish something similar, at least if we can use the criteria of high content similarity but author/source diversity as indexical of more potentially truly anomalous reports. I think further combined manual and machine analysis is an important growth area for UAP research.

My analysis identified several clusters that include a diversity of author/sources. No cluster includes even representation of all four sources, but two clusters have good representation for three of them (Table 2). The clustering was at least somewhat robust to inclusion of over 5000 distractor items from a wholly different dataset (Spearman correlation = 0.23,  $p < 0.001$ ). Although the magnitude of this correlation is in the low range, it is important to realize that cluster analysis is an exploratory analysis technique that is sensitive to the input data (Kaufman & Rousseeuw, 1990). The task with distractors is analogous to calculating a mean from a population of interest while including values from other populations and not telling the analysis which population each data point came from nor how many reference populations were included.

I applied an LLM to help characterize what the various clusters were "about." There is substantial variation in the theme proportions by cluster (Figure 5), but only some of these themes, as assigned by the LLM, correlated

substantially with my own manual coding (Table 3). The themes for anomalous lights and sounds, physical evidence, and humanoids all showed correlations for code application above 0.5 between the LLM and me. The themes for abduction, time slowing, and the witness being recently asleep showed complete agreement between the LLM and me for their absence, but neither I nor the LLM identified any cases with these themes in the randomly selected 100 cases we both coded. Further analysis would be required to assess the agreement level for these themes when they are present. The themes for opaque objects, and the social context of the experience (alone, with others who did not share the experience, and multiple witnesses) were not correlated above 0.5 between me and the LLM. One possibility is that LLMs still struggle with correctly assessing the social context because this is often highly implicit in these reports, and my own coding of them is an inferred best guess.

I think further detail about the social context is actually a very important opportunity for UAP research. This is because multiple witness events begin to get close to the normal scientific method. Science relies on multiple independent observers being able to replicate observations. Although often these multiple observers are together when the event happens, and thus not independent, sometimes they might be independent. For example, Jacques Vallee has said that as a boy he saw an opaque UAP object in the sky at the same time that a friend of his saw it from another location (Tattoli, 2022).

The social context of a witness seeing an anomaly, but others around them not seeing it, is also of interest in that

it cuts to the heart of the question of anomalies. Assuming the witness was not merely mistaken, then either they experienced some kind of psychotic event or they experienced something real but that operates outside our current understandings.

The LLM coded themes were more common in documents from the most author/source diverse cluster as compared to all other documents (Table 3), and this was true for the themes that showed more robust correlations between my own manual coding and the LLM (light, sounds, physical, humanoid). These data include witness accounts that are spread out across different continents, at times from witnesses speaking different languages, and separated by up to 100 years in time. The fact that author/source diverse cluster can be identified, and that this cluster exhibits themes proposed to be part of this core experience, is consistent with the idea that an experience shared in common underlies why people make these reports.

What then explains the *core anomalous experience* that appears to be responsible for at least some of these witness reports in modern anomalies databases? I do not know, but I do think these results support the contention of experiencers and citizen investigators that there are real experiences that ground at least some of the reports. When it comes to explaining, we again enter a currently still liminal space. Initially, to the skeptical scientific mind, it may seem easy to explain these experiences through reference to known causal mechanisms. For example, experiences of humanoids/abduction might be explicable through pareidolia, which is a known tendency for our brains to see faces or images in random visual noise. Pareidolia might have been adaptive in the evolutionary past as a kind of agency detection (Maij et al., 2019). Researchers generally agree that it is adaptive for humans and other animals to be 'hyperactive' in their agency detection; that is, our senses and cognitions are tuned to make false positive errors more so than false negative errors. The adaptiveness of this tendency to falsely detect faces or agency is intuitive if we consider past natural selection from predation – being the one who didn't think that was a bear/lion/etc. crouching in the woods could be very costly (Barrett, 2000; Maij et al., 2019).

Further reflection, however, often suggests such easy explanations to known mechanisms are implausible. In contrast to pareidolia as a putative explanation, many of the anomalous experiences in question seem well beyond what can be attributed to pareidolia because they involve more than just briefly seeing a face but can include watching the motion of an object and even social interaction

with it (Kelleher, 2023; Kelleher & Knapp, 2005). Colm Kelleher investigated these sorts of anomalous phenomena linked to UAP experiences at Skinwalker Ranch as part of the Advanced Aerospace Weapons Systems Application Program (AAWSAP) that was funded by the Defense Intelligence Agency. These experiences can involve strange but richly detailed interactions with the lighted objects or humanoids, and in ways that defy logic and seem absurd. Vallee's books, as well, detail many such encounters, and the detailed absurdity of these experiences is one of the pillars for his argument that UFO and fairy experiences, whatever causes them, are derived from the same root cause. In his most recent book, Whitley Strieber provides accounts of individuals, including entire family groups, having detailed interactions with humanoids that last hours in duration or occur across multiple days in contexts when the human experiencers are fully awake and otherwise going about their normal activities (Strieber, 2023).

The rich detail of these experiences does not itself argue they have any extraterrestrial, interdimensional, or supernatural cause, but I think it does exclude many of the straightforward cognitive mechanisms like pareidolia that are known to current science. Relatedly, in my analysis I created an opportunity for the being asleep theme to potentially be correlated with the highest author/source diversity experience. That witnesses were waking from being asleep surely would be a universal human experience, and one that potentially could explain many cases of misperception, but being asleep was a very rare theme overall (including as assessed by manual coding), and it was not correlated with author/source diversity (Table 3). The lack of easy psychological explanations like pareidolia or sleep suggests UAP studies could be of great value to new understandings of the human mind and brain, even if they do not lead to evidence of alien contact. Consider, for example, experiences that only the experiencer has, but while in the presence of other people. There may well be a mechanism by which human brains are able to snap into a fully hallucinatory state decoupled from the empirical facts and social relationships around them, and then snap back into a fully functional and non-psychotic state, but currently, such a mechanism is not understood by psychiatric science. Such phenomena can be particularly difficult to study with proper scientific control if they are experienced by only a minority of any specific human population, because science relies on replication (Matthews and Robertson 2024). Recent psi and precognition research

suggests a way forward by trying to enroll specifically the kinds of humans who have the relevant experiences or abilities by means of cognitive pretesting validated by prior studies (Escolà-Gascón, 2022; Escolà-Gascón et al., 2023). This approach, to my knowledge, has not been attempted for UAP experiences but may be a promising avenue for future UAP research.

## Limitations

This study has several limitations. As noted at the outset, the data analyzed were collected through a complete hodgepodge of non-replicable conditions. Science requires independent observations by independent observers to match in order to make progress. That being said, these anomalies data are not inherently more disorganized than are many citizen science data (Chari et al., 2019), and the fact that the results exhibit statistical patterns even after Bonferroni corrections suggests there is a “there there” with these data. The fact that they were collected in such variable ways almost underscores the substance that any statistically meaningful patterns occur in them.

Another limitation is that I have undertaken only one set of lexical and LLM-driven analyses. The data are rich and complex, and additional or different analyses might yield new insights beyond what this paper investigated.

I have focused on finding and analyzing documents in author/source diverse clusters, but my analysis does not explore longitudinal trends in the data. Particularly if combined with other data sources known to exist (MUFON, NIDSci), there might be enough citizen data for a time series assessment of trends. Do flying saucer experiences trend over time or peak in a particular decade? Did abduction experiences peak in the 1980s as asserted recently by Strieber (2023), reflecting either a shift in the cultural transmission of abduction stories or a shift in the behavior of extraterrestrial abductors? I am unaware of studies that investigate these questions quantitatively, but some combination of manual and machine thematic coding likely would be able to test these longitudinal hypotheses.

## Future Research

Based on the results of this current study, further investigation into more specific aspects of the data might yield additional insights. Future studies might take different approaches to the same or similar databases, such as treating the assigned themes as the primary data for the clustering of documents rather than tokenized words as I

have done. Additionally, a future productive study design might operate by empaneling only particular individuals with high UAP experience likelihood and then proceed to record experiences prospectively for this minority group within the population. I think particular attention to the social context of UAP experiences is also a potential area to improve data collection and analysis.

We must also acknowledge, however, that the ontological speculations of Lovecraft’s cosmicism, which are grounded in the factual reality that our own intellects evolved in particular ecological circumstances, mean scientific understanding of UAP may be among the most challenging tasks our minds have attempted if their ultimate cause are factors far outside the ecology that evolved our own minds. In other words, extraterrestrial/interdimensional beings that operate outside our known physics, and may have evolved their minds and behavior under radically different conditions than the conditions that evolved ours, are logically a very plausible possibility given what we know about evolution, but by the same token, they might be highly inscrutable to our scientific epistemology.

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## END NOTE

<sup>1</sup> From Moore’s introduction in Klinger 2014, “Sonia wrote, “Although [Howard] once said he loved New York and that henceforth it would be his ‘adopted state,’ I soon learned that he hated it and all its ‘alien hordes.’ When I protested that I too was one of them, he’d tell me I ‘no longer belonged to these mongrels’ ‘You are now Mrs. H.P. Lovecraft of 598 Angell St., Providence, Rhode Island’” (Davis, *Private Life of H.P. Lovecraft*, 11”).”

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## APPENDIX A

### PROMPTS

Prompts for large language model (LLM) (GPT4.0 32K June 2024 build) to answer “yes” or “no” about each document:

*You are a researcher tasked with identifying key themes from people’s accounts of unusual and anomalous experiences. Carefully examine the following textual entry and assess whether:*

*answer\_opaque: The entry discusses abnormal, anomalous, or unexpected appearance or movement of an opaque physical object or objects.*

*answer\_light: The entry discusses abnormal, anomalous, or unexpected appearance or movement of a light or lights.*

*answer\_sounds: The entry discusses abnormal, anomalous, or unexpected sounds or voices.*

*answer\_alone: The entry describes an experience of only a single person who was alone.*

*answer\_noshare: The entry describes an experience of only a single person who was with other people at the time, but the other people did not share the unusual experience.*

*answer\_multi-witness: The entry describes an experience shared by two or more people, and possibly many of them.*

*answer\_physical: The entry describes an experience that was accompanied by physical evidence such as something behavior abnormally. For example, an animal like a dog or a horse, a machine like a car, or a tool like a compass behaves abnormally.*

*answer\_humanoid: The entry describes an encounter with a humanoid being or creature but that is not a human being.*

*answer\_abduct: The entry describes an experience of being abducted by a craft or abducted by a non-human humanoid being or creature.*

*answer\_timeslow: The entry describes a sense of time slowing down, speeding up, or in some other way time being altered from how it is normally.*

*answer\_asleep: The entry describes an event that takes place around the time the person was falling asleep or just had woken up from sleeping.*

## APPENDIX B

## Examples for Each Author/Source (Up to 5) of Documents Grouped by the Cluster Analysis into the Most Author/Source Diverse Cluster (cluster 1)

Source	Document
fairly	While traveling at night, on a road that ran up some mountains, we saw a shapeless white form that appeared to be a white shopping bag blowing around in the wind moving quickly up the mountainside. It was moving against the wind, however. Uphill. We had pulled off the road, at a lay-by, to look at the view of the city lights down below, when we noticed the shape jumping from tree to tree towards us. It was about two or three square feet in area, and a matte bluish white color. Like a large pillow case or, like I said earlier, a shopping bag. No markings or features, not shiny at all, looked more like a strange cloth than a plastic. Both myself (American) and my fiancé (Irish) had a feeling that whatever it was, its intentions were not good. We had a general sense that something unpleasant would happen if it caught up to us, so we jumped back in the car and hightailed it out of there. Like an amorphous shape, vaguely rectangular. Size changed through the experience.
fairly	I awoke and saw a flashing light in my closet. At first I thought it was my phone but realized quickly that my phone isn't in the closet. So I stared at the light for a few more seconds, then suddenly it moved, it jumped from the closet to the ceiling in a single flash, it was coming towards me. Then it flashed again and moved further to my bed, then it hid behind my boyfriend and I thought, "ok, it's a lightning bug, is all." So I laid back down, but then it flashed again, this time it went over me heading back to the closet. I got up and got my phone while it was still flashing. As it neared the closet, it pulsed and hovered there. I turned and got a picture of it, but it was a little blurry. It disappeared into my closet since. I've recently have been having dreams of dark and light fairies in the last two weeks. It's not my first time seeing the flashy ones, except this one in particular stayed longer and flashed from one place to another faster than speed of light. Currently am having visions of dark and light faeries, woodland elves, Avalon. I made an oil specifically for this and a slight touch of it connects you with them. But at the time I saw the "flashy faerie" I did not have this oil on, it happened a few months ago.
fort	[Objs / Sky] / K / 1915 / Feb 14 / This for the sake of details not explained. / The Daily Standard (Kingston) / Brockville, Feb. 15 <sup>th</sup> four aeroplanes passed over this city at 9:15 last night and sped in the direction of Ottawa. The city was wildly excited by the sight of the aircraft, which seemed to burst into sight almost right overhead. The first machine was flying very rapidly and very high. Very little could be seen, but the unmistakable sounds of the whirring motor made the presence of the aircraft known. Five minutes later the second machine could be heard. In crossing the river three fireballs were dropped at one minute intervals. In dropping, they left a streak of light from where they had been thrown out, and it was this that had attracted the attention of the residents. Hundreds of feet the three lights fell. A few minutes later another machine passed over the east end of the city. In another interval a machine came over the other end of the city. / Same issue, is another account. Says that had been explained that were nothing but toy air-balloons sent up from Morristown, N.Y. / One notices this "that large numbers of persons had watched the objects "notwithstanding the rainy weather".
fort	1884 July 30 / (beam) / Philadelphia / ab. 10 p.m. / Appearance like a narrow thin, white cloud from a point about 30 deg above the horizon in the west to ab 20 deg beyond the zenith in the east. It looked like the tail of a comet. It was moving. In 20 minutes the western end had reached the zenith. Then it looked shorter and the eastern end dimmer. It passed from view in about half an hour. / Sid Mess, p. 251 / That Prof Swift had seen the obj at Warner Observatory and could not explain it. / Sid Mess 3/251 / He thought it a long narrow cloud at first, but its exceedingly slow motion convinced him it was not. It was a conspicuous object for ab. 45 minutes, then disappearing in the eastern horizon. / (Also it was seen at the Carleton College Observ.)
fort	[Invaders]:Invaders / 1885 / Sept 13 / Near Jutroschin, Posen, by Herr M. (sic) Scholtz, chemist of [Jutroschin] / About midnight in fields. He saw a light that astonished him because it was white and more brilliant than a lantern. It moved toward him and he watched it several minutes. Suddenly a ribbon of light shot from it, and then another, directed toward the ground. He says that with an astonishment that he would never forget he watched this brilliant thin ab. 8 minutes. He says that he was then obliged to continue on his way without seeing the end of the spectacle. Upon Oct 29, ab. 11 p.m., at this place again, he saw the object again, shining even more brilliantly. Sparks gushed from it, long lines of light were cast out. The lights disappeared and he returned to his home, The next day, with the will o' the wisp idea, he returned to the place and searched for the kind of ground, or bog, from which inflammable gases might rise, finding nothing to support the idea. / Bull Soc Belge d'Astro 7-15.
fort	1895 March [13] / Manchester / "aurora" / Lit and Phil Soc. Mem and Proc 4-9-167. [VII; 1242. "Ordinary Meeting, March 19th, 1895." Memoirs and Proceedings of the Manchester Literary and Philosophical Society, s. 4 v. 9 (v. 39; 1894-1895): 167-171, at 167. Mr. A. Brothers, F.R.A.S., gave a description of a supposed display of Aurora borealis as seen at Higher Poynton, near the Manchester, Sheffield, and Lincolnshire Railway, on Wednesday, March 13th. The display was of an unusual kind. As there was an irregularly shaped cloudy mass of light with auroral streamers flickering past and finally collecting in narrow bands of light. The long irregular cloud then moved towards the west and formed in a bright column of light, faint at first, but it became intensely white. The upper part then spread out in the form of a fan, having very much the appearance of Donati's comet when at its brightest. The column of light formed and disappeared almost due west.] 1895 March 13 / At 7:35 p.m., at Muirkirk, N.B., a belt of light from E to W from near the hind quarters of Leo to the head of Aries. At the time the streak was altogether cometary in appearance, beginning in a fine point, but it gradually changed in form, moving at the same time towards the south. Also shortened so that at 8:05 it extended only from Gamma Geminorum to Gamma Ceti. / Nature, 51-581 / motions given" p. 517 / had a beak. / See March 13, 1896.
fort	1892 Feb 8 (?) / (Ch) / Star-like object, oscillated in sky 10 hours. / newspaper story / E Mec (Eng) 55-34 / Ch 31. [VII; 381. Noble, William. "Harvard Observatory..." English Mechanic, 55 (no. 1406; March 4, 1892): 33-35, at 34. "But if we may judge from the following extract (which I translate from the Stockholm paper l'Aftonblad[et] of the 9th), he, in our popular slang, 'isn't in it' with his Swedish confrères. 'In the environs of Hochlanda,' says the paragraph in the Stockholm journal, 'there was seen, between 9 and 10 o'clock at night, in the direction of the North, to the west of the Great Bear, and pretty high up in the sky, a large star, which seemed to be of the first magnitude, and which rendered itself conspicuous by its extraordinary movement. At first it advanced with great rapidity, and in a straight line, towards the East for an estimated distance of 125yds. (!), appearing then to be oblong, and approximately 12in. long by about a quarter of that wide, and to be of a fiery-red colour. It then returned to its first position, afterwards to move not less rapidly towards the West, to regain, after about an equal interval, its original position; subsequently rising slowly, then descending considerably below it, and finishing by recovering it. It moved principally in straight lines, with a very slight elliptical curvature, but incessantly changing colour. This agitation (or movement) continued for 10 hours, when it ceased. The phenomenon was observed by several people. The sole hypothesis admissible at present,' the writer goes on to say, 'in the study of these meteors, which are bolides of which the trajectories are often perturbed in their initial direction, is that it may happen that after having encountered atmospheric strata of greater and greater density, the bolides experience a kind of ricochet, which prevents their further approach to the earth, and sends them back towards the upper regions of the atmosphere' circumstances which may occasion changes in the form and curvature of the trajectories of bolides. We must, nevertheless, add that the symmetry of the movement in the present phenomenon is without precedent in the catalogue which treats of these phenomena.' I should think so. An elliptical bolide of a fiery red, but continually changing colour, which oscillates like a pendulum and remains visible for 10 hours!!! is not likely to be included in any 'catalogue which treats of these phenomena.'"] 1892 Feb 9 / Great parhelion / Lake Benton, Md. / World 10-1-2.

Source	Document
magonia	O. Guarichi was walking on the beach with his dogs when he saw an object come from the sea and land. Two men, 1.80 m tall, wearing metallic-looking uniforms, emerged. One of them picked up objects from the beach. There was an exchange of gestures with the witness. One of the dogs turned away when the witness approached the craft, which was 20 m wide, 3 m high, and showed flashing lights as it left.
magonia	A large object was seen to fly morning slowly toward the north. It seemed ready to land and five men (F. G. Ellis, James Evans, David Evans, Joe Croaskey, Benjamin Buland) drove toward it. About 7 km north of Linn Grove, they found the craft on the ground, came within 700 m of it, but it "spread its four giant wings and rose towards the North." Two strange figures aboard the craft made efforts to conceal themselves. Witnesses were surprised at the length of their hair. Most residents of Linn Grove saw the craft in flight.
magonia	Jan, 1952 Weston (Wyoming), A 38-year-old rancher saw a "shooting star" that suddenly stopped in mid-air between him and a mountain. It was seen spinning in a clockwise direction. It had one red window periodically facing the observer. It went down toward the Little Powder River and came up again. The witness turned his car to send light signals, to which the object seemed to respond by stopping its red window facing the witness's location. Spinning resumed, the object rose and came down. A similar craft arrived, and both went into the deep valley, out of sight.
magonia	Mary Starr was awakened by a brilliant light and saw through her east window the fuselage of a craft that hovered in midair. Aboard were two men, each with his right hand raised, wearing yellowish jackets. A third man joined the first two, then all lights went off inside the craft while it glowed like brass. A spinning antenna like device was noted. A few minutes later it flew off.
magonia	William West and Wallace Liddell saw an object similar to a shooting star coming close to them, appearing then as an oval, fluorescent craft, about 40 m in diameter, which almost touched the grass. They rushed to catch it, but it jumped away, turning into a bluish-white sphere with a dark red center. Each time they tried to reach it, the craft jumped farther away. It cleared a high fence and slowly vanished. The Invercargill Weather Bureau had no explanation.
nuforc	Black triangle with glowing warm orange lights at each corner. Silent, moved across sky. Almost invisible, seemed to be very large. My neighbor and I were watching the meteor shower and we saw a large black triangle with 2 orange lights move across the sky. Was not as high as airplanes, was significantly bigger. So silent, it almost seemed as though it absorbed any sound around it. Moved in such a smooth way, different than anything I have ever seen. I could not look away, I was so mesmerized.
nuforc	Saw the object while in flight During helicopter flight at approximately 1000' AGL, the pilot saw a strange object that had symmetrical lines while under night vision goggles. The object was very far from the aircraft and moved quickly and flew over top of the helicopter while in flight. One of the crew members were able to take a picture of the object and were later informed by a friend on the ground in another location that they saw the same object and were able to get a video of it.
nuforc	Black kite/Diamond with lights at each point. Back in late July 1993 on a caravan park in Caister on sea a group of 8 of us walked down to our friends caravan to get him to come out and join us. As we were all outside his caravan a Black kite shaped object as big as a bungalow flew silently about 30-40ft over our heads. There was a single red light at the front and back points and a single yellow one on each side point. We were only a couple of hundred yards from the sea and this object was heading inland from the direction of the sea.
nuforc	12 or more dim lights in a perfect chevron or boomerang shape I was observing the night sky for only a few moments, when I noticed motion in my peripheral, to the north and about 80 degrees up from my location in my back yard. It was 12 or more very faint points of light forming a perfect chevron or boomerang. I watched the shape move in a linear constant speed from East to West with no sound. At first I thought it could be birds migrating, given its apparent size and silence from my perspective. But its shape was perfect and its path was perfectly straight. I could detect a shape that was greater than just the points of light as it passed over the stars, again like that of a boomerang or plane wings with no fuselage. From my perspective, if the form were a known aircraft, it would be most similar to a B2 Bomber. However, if it were a conventional aircraft, it would have been no more than 1000 ft above the ground. Which would have produced immense sound.  Lastly, the appearance of the shape was mildly streaking or fluid in its motion. Almost like it was passing just below the surface of water. I observed it for 10-15 seconds, starting at approximately due north of my location, until I lost sight of it over the West horizon.
nuforc	Bright orb with a beam of light shooting straight up out of it We went for a night swim in our pool around midnight. We were looking at the stars when I saw a really bright star in the middle of a triangle of more dimly lit stars. Then the bright star slowly started getting bigger, fast enough that I didn't have time to point it out. Suddenly it was about half the size of a full moon, but it still looked like a fuzzy star, just bigger. Then a beam of white light shot straight up out of it. The beam of light was very thin, crisp looking, not hazy. It just shot straight up out of the big fuzzy star like orb, then the whole thing immediately vanished.