

Report on a Survey of the Membership of the American Astronomical Society Concerning the UFO Problem: Part 2

PETER A. STURROCK

Center for Space Science and Astrophysics, Stanford University ERL 306, Stanford, CA 94305-4055

Abstract — Refereed journals, to which scientists turn for their reliable information, carry virtually no information on the UFO problem. Does this imply that scientists have no views and no thoughts on the subject, or that all scientists consider it insignificant? Does it imply that scientists have no reports to submit comparable with UFO reports published in newspapers and popular books? The purpose of this survey was to answer these questions.

Note: Sections 1-3 and the Appendices were published in Vol. 8, No. 1 of the Journal of Scientific Exploration. Section 4.1-4.3 appears below; Section 4.4-4.9 will be published in Vol. 8 No. 3.

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4. Reports of Observations

Question 7 of Q1 is "Have you yourself witnessed or obtained an instrumental record of any event which you could not identify and which may be related to the UFO problem?" Of those responding without further prompting, 70 answered "Yes" to this question. A second questionnaire (42) was sent to each of these respondents and 45 were completed and returned. A small number of respondents had more than one event to report. On the other hand, some of the respondents checked "Yes" even though they had identified the subject of their observation. Since the comments are interesting, these reports are included as "Identified" and numbered "ID1", etc. The remaining reports, which were not positively identified by the respondents, are grouped under various headings. Within each group, reports are ordered according to increasing length of the account. Also included are brief accounts of certain material in the scientific literature which some respondents believed relevant to this study.

I have attempted to reproduce the information submitted to me with its original character, adding no emphasis of my own. However, it is possible that this attempt has not been entirely successful since it was necessary to rearrange the material into narrative form and I chose to ignore certain items of Q2 if they seemed to yield no significant information. Wherever the respondent gave a narrative account of an event, this has been reproduced as faithfully as possible.

My intention has been simply to reproduce for the benefit of the reader the information which I obtained in response to my letters and questionnaires. In general, I have made no attempt to evaluate the cases. The only exceptions were Cases PH4 and PH6. The latter was submitted to me before the original mailing for this survey, and I have spent considerable time examining the film and related data.

One difficult matter was to decide what information needed to be suppressed in order to preserve the respondents' anonymity. My first inclination was to suppress all place names but this was quite unsatisfactory since the location of an event is important, especially if anyone is to check for nearby associated activity near the date of a reported event. At the other extreme, the location of a house on a named street in a specified city would clearly identify the respondent, so that street names have been suppressed. In one case where a respondent was specially sensitive, the name of the city has been suppressed. I sincerely hope that the steps I have taken serve the dual purposes of revealing information about the observations and suppressing the identities of the observers.

The reader should note that, in completing Q2, each respondent was asked to attest that his account was submitted in good faith, to preclude the possibility that an AAS member would concoct an account in jest. Each respondent complied with this request.

Question 8 of Q1 asks each respondent to imagine that he is asked to evaluate a case submitted by one of his colleagues and to specify what "prior probabilities" he would assign to a set of eight possible causes. Each respondent completing Q2 is asked to summarize his assessment of his own case by assigning "post probabilities" to the same set of possible causes. These probabilities are listed at the end of each case for which the respondent provided the necessary information. The possible causes were listed as follows:

- a. Hoax
- b. Some well established phenomenon or device
- c. Some established but unfamiliar natural phenomenon
(such as ball lightning)
- d. Some unfamiliar terrestrial technological device
(such as a weather balloon)
- e. Some hitherto unknown natural phenomenon
- f. A technological device not of terrestrial origin
- g. Some other cause which you can specify
- h. Some other cause which you cannot specify.

4.1 Identified Observations

ID1. Respondent notes several observations "which could be adequately explained, but were referred to by others as UFOs."

ID2. Respondent writes: "I'm sorry I don't have a UFO to report. The thing I saw was an *identified* flying object but it took a bit of time to recognize. A non-scientist might have been puzzled but there is no mystery."

ID3. *San Francisco Airport, date not specified.* Respondent once witnessed what proved to be "a single *landing light* left on after take-off from San Francisco Airport. The low altitude made it seem to go fast."

ID4. *Flagstaff, Arizona, and Cerro Tololo, Chile. Dates not specified.* "I have seen green barium clouds, on many occasions, from Flagstaff, Arizona, and one rising rapidly over the Andes, from Cerro Tololo. All observations were while observing, and were confirmed by others."

ID5. Respondent mentioned observing an event from the air, and guessing (at the time) about its nature. On checking with the FAA, his suspicions were verified, since the event was identified with the rocket release of sodium in the upper atmosphere, about 500 miles south of the point of observation.

ID6. *Chicago, Illinois, "several years ago".* Event described as follows: "While walking to the drugstore one night, I noticed a band of moving lights in the sky. The extent was small."



Fig. A for Case ID6.

I estimate, recalling this event from the past, its size as $1/2$ degree. At the time I could see no usual explanation. Several years later a similar event occurred in Pittsburgh and the explanation was apparent. As previously I saw a band of moving lights. Then the plane (as it turned out) turned and I saw it was a plane carrying a 'marquee' type lighted sign for advertising above an outdoor event. By sign I mean one of those lighted signs where the words move across the viewing area. These night signs are apparently not that common as these are the only two times I have seen them."

TABLE for ID6

	a	b	c	d	e	f	g	h
Priors	.05	0	.17	.17	.22	.17	0	.22
Posts	0	0	0	1	0	0	0	0

ID7. *Place unspecified, date unspecified.* One respondent reports witnessing a puzzling observation which was later identified as a mirage of a star.

ID8. *Pensacola Beach, Florida, 1958 to 1960(?) - summer, about 5:00 p.m.*
 "In 1960 I was a passenger in an automobile traveling west from Fort Walton Beach to Pensacola, Florida, a distance of about forty miles. The road is close to and roughly parallel to the coast of the Gulf of Mexico. It was late in

the afternoon of a clear and sunny day. At a point about twenty-five miles from Pensacola I suddenly sighted ahead, and what appeared to be in a position just off the coast, a classic 'flying saucer.' It had a bright aluminum hue and the familiar shape. Unfortunately I did not have a camera for the sighting would have been recorded faithfully on film. The 'object' was kept continually and faithfully in sight.

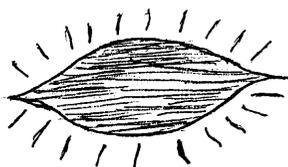


Fig. A for Case ID8.

Shiny aluminum-like color.
No features other than shape.

To say I was excited would be an understatement. When we approached the area known as Pensacola Beach where a road led to the Gulf coast proper the 'object' was seen to fade rapidly from sight. In the place where it had been seen there was observed to be a very thin and almost transparent cloud layer at an altitude of about one thousand feet. (I have been a U.S. Navy aviator 1934-55). The 'flying saucer' phenomenon was the result of sunlight reflected from this thin cloud layer which was small and localized. To my knowledge no one else observed this phenomenon since there was no mention of it in the news. I did not report it because I am a skeptic and did not want to reopen the issue."

The phenomenon was seen in bright daylight, about two hours before sunset.

TABLE for ID8

	a	b	c	d	e	f	g	h
Priors	1	.3	.2	.2	.1	0	.1	
Posts							1	

The object was about 20" to the left of the direction of travel, and the sun about 20° to the right. The object appeared to be solid and was sharply outlined, apparently reflecting. The angular size was about 1°.

In the above, g is identified as "meteorological" for the priors, and as "reflection of sunlight from a thin low cloud layer" for the posts.

Respondent also gives the following information: "In the coastal regions of southern California temperature inversions are common. Having flown airplanes in this area for a number of years I can attest to their frequency. The air temperature *rises* with increase in altitude to about two thousand feet after which it decreases with increase in altitude at the normal lapse rate. From the ground the inversion cannot be noted by visual observation except when there is smoke, which will not rise above the inversion layer. The inversion layer acts as a mirror. (A comparable phenomenon is the reflection of *sonar* sound waves by a water layer at which there is a marked change in temperature."

"When returning to the port of San Diego, by ship, we frequently were able to observe islands, that we knew were below the horizon, apparently sitting in

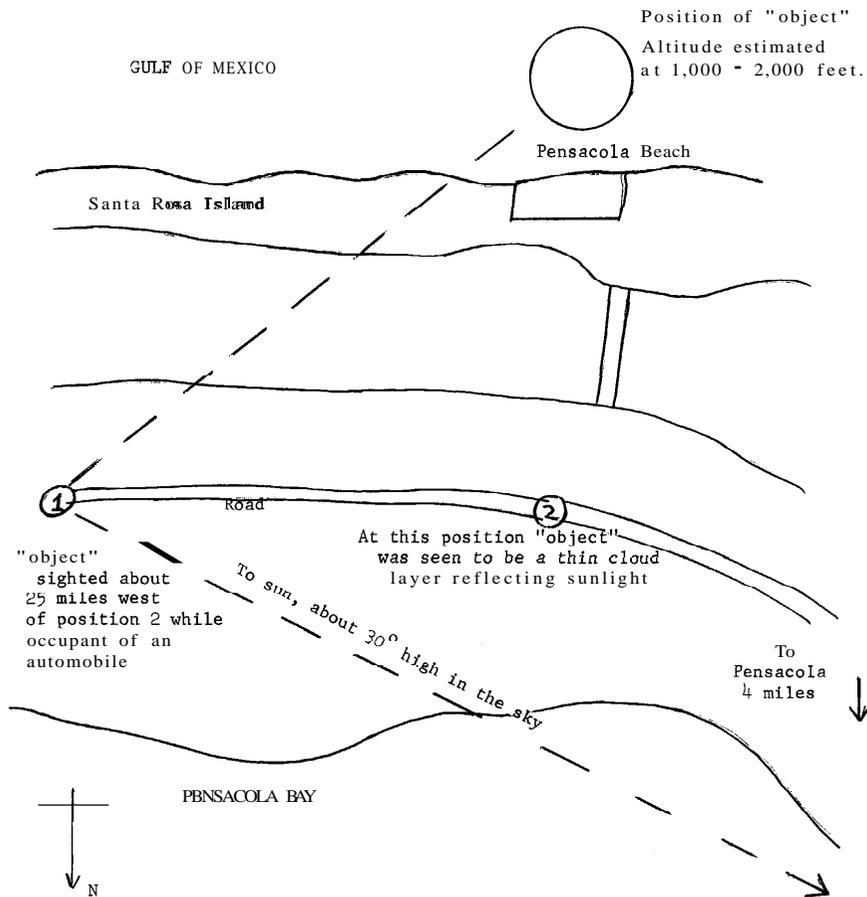


Fig. B for Case ID8.

the air above the horizon. Features on the islands, as so seen, could be observed in binoculars. This phenomenon was caused by the inversion layer acting as a very effective and efficient mirror."

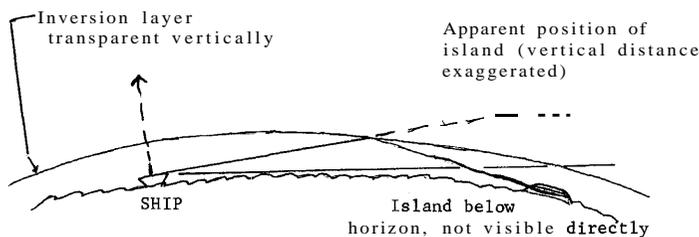


Fig. C for ID8.

"Another phenomenon is the reflection of light by automobile window glass. I often notice this when driving past the airport at night."

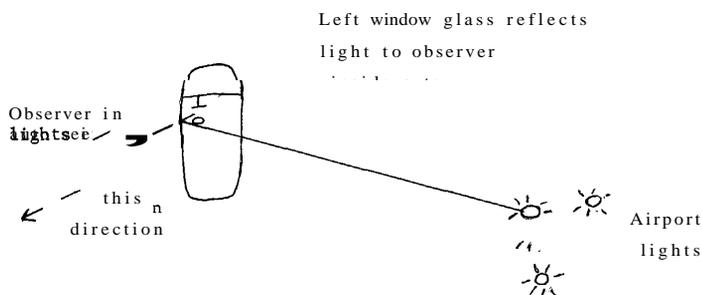


Fig. D for ID8.

ID9. *Buffalo, New York, date unspecified.* "I have observed the night sky, or portions thereof, for thousands of hours in the course of both amateur observing in earlier years and in the course of my professional career during the past 6 years. I have only twice witnessed strange, initially unidentified phenomena, sufficiently noteworthy to capture my interest, besides the event reported above, (NL21). The first event, which was given banner-headline treatment on page 1 of the *Buffalo Evening News* as a rash of UFO sightings, and which struck me as very unusual when I observed it, was identified within an hour as the launching of the Tiros I weather satellite."

The second identified event is the case ID10.

ID10. *Tucson, Arizona, 1973, October 5.* "(This) event is reported in the enclosed materials and is identified as a Titan missile launching. Nevertheless I thought you might be interested in this report. The first part constitutes my own written report of an observation of an anomalous celestial phenomenon *prior* to my making detailed investigation. The addendum reports my subsequent identification of the phenomenon as a probable missile launch from Vandenberg. This report, including several inaccuracies and inconsistencies, is perhaps typical of the reliability of a UFO observation by a trained observer. I also enclose my report to —, prepared after my identification of the phenomenon. I find it interesting that the — investigator, who is a graduate student at the University of Arizona, Department of Astronomy, was more prepared to believe that my report, and others of the same evening, were of a genuine extraterrestrial visitation rather than the more realistic Titan missile launch."

The following is the original account written *prior* to his investigation:

"Observation of an Unusual Luminous Phenomenon in the Nighttime Sky on October 5, 1973

"This report concerns a striking and unusual phenomenon which I witnessed for several minutes on the evening of Oct. 5, 1973, from the vicinity of my

house in northwest Tucson. As a professional astronomer familiar with observing the nighttime sky, I believe this phenomenon was sufficiently unusual and difficult to explain to be worthy of this written description. The phenomenon was witnessed by at least one other person some miles distant, and may be related to a rash of 'UFO' reports that have been occurring in recent weeks in the southern USA.

"Very near 8:00 PM Mountain Standard Time on Friday night, Oct. 5, 1973, I was strolling around my house looking at the clear sky. While near the NE corner of my house, I noticed a brilliant light in the sky $7'' (\pm 2^\circ)$ north of west, about $5''$ to 7° high in the sky (rough estimate). The location was somewhat to the left of Safford Peak, in the Tucson Mountains. For reasons I cannot recall, I judged the distance of the light to be several miles away, placing it over Interstate 10 or further west, but not behind the crest of the Tucson Mountains. It is probable that my distance estimate was based on the superposition of part of the phenomenon on the mountains, but I cannot be sure. In any case an independent report on the same phenomenon by an observer located approximately south of the position where I estimated the phenomenon to take place, confirms that the location was where I judged it to be, approximately.

"The light was bright white, with perhaps a yellowish tinge, approximately stellar in appearance, although possibly subtending a small angle, and of roughly -6 magnitude. It was not as bright as the gibbous moon (which was in the sky) but distinctly brighter than the planet Venus, which I had looked at earlier in the evening. Within a few seconds of when the light appeared, I became aware of a large 'halo,' of faint surface brightness, surrounding the bright light. The halo had the appearance of a spherical shell of roughly 5° diameter (possibly this was superimposed in front of the mountains). My indistinct impression was that this halo erupted from the light itself in a kind of explosion or puff-of-smoke, but that when it reached a certain radius from the central source (in about a second or less), it then remained of fixed radius, reminiscent of a large balloon being blown up with a fixed amount of air. These details may be inaccurate, however.

"In any case, within a few tens of seconds, at most, the bright central light began to fade and transform itself into an extended disk with soft edges, accurately estimated to be 3 moon diameters in size ($1\ 1/2^\circ$). The transformation was completed in 5 to 10 seconds. The disk was neither sharp-edged, nor was it a diffuse cloud. Rather it was quite circular with an almost constant surface brightness out to maybe 10 or 15 minutes of arc from its edge, at which distance a 'limb darkening' or 'soft edge' was apparent. By this time the large luminous halo was no longer visible (probably faded). The central disk, of a whitish or possibly bluish hue, which was quite bright at first, gradually faded away in the course of at least 5 minutes (possibly as long as 10 minutes). It did not change its size, sharpness, or position as it faded away. Indeed, the entire phenomenon was devoid of any translational motion.

"Within seconds of the onset of this phenomenon, I recognized it to be highly unusual and noteworthy. I recall thinking at the time that, while the phe-

nomenon must have a natural explanation, it was sufficiently weird and striking as to enhance my appreciation of the wonder many laymen ascribe to 'flying saucers' and to the total inadequacy of such explanations as 'Venus,' or 'refractions,' or 'balloons' to explain the phenomena. I tried testing various hypotheses in my head. I noticed an airplane flying southeast along I-10 to the south of the phenomenon (probably a small propeller-driven airplane) and judged from its rate of motion that it might have been near the phenomenon at the time it commenced. My guess that it was something dropped from the airplane vanished as time revealed the phenomenon to be totally stationary in the sky. Some of the details of the phenomenon seemed to rule out some kind of explosion or flare, in particular the character of the 'disk,' which remained luminous and visible for an extended period of time with no apparent external source of illumination nor any tendency to disperse as a cloud or puff of smoke would. I finally judged that the phenomenon could probably be generated (as a hoax) given an enormous effort, but that it was a highly unusual and improbable natural event or normal man-caused event. Since I was sufficiently impressed by the early behavior of the phenomenon, I chose not to stop watching it to call my wife from within the house, but as soon as the disk had faded to near invisibility (about 8:10 PM MST), I rushed in the house to call A, an expert on UFO's who worked with the Condon Committee. He was out, but I relayed the observation to his wife who suggested a flare as a possible explanation. We discussed some of the difficulties I perceived with this explanation. She reports that immediately after I hung up, her next-door neighbor, B, telephoned her to report the same phenomenon. I made no further follow-up inquiries concerning the phenomenon, but expected to see reports in the next day's newspaper — however there were none.

"A few words about my background: I am a professional astronomer, specializing in observational work, and have spent thousands of hours outside looking at the nighttime sky (both recently and for many years as a teen-aged amateur astronomer). I am not given to seeing unusual phenomena for which ready physical explanations seem unlikely. The only other occasion took place more than a decade ago and, while I was unable to explain the phenomenon, it was far less dramatic or interesting than the present case (being essentially a searchlight-like patch of light moving across the sky, which would have been fine had there been clouds but the sky was very clear — however I did not have on my eyeglasses at that time). [See NL21.]

"Having composed this report, I have one additional comment to make: It seems to me that the scientific community owes it to the public to provide a responsible clearinghouse for reports like this. With the Air Force Project Bluebook disbanded, I myself am at somewhat of a loss to think of a thoroughly responsible place (person, office, journal, organization) to which to send this report with any reasonable likelihood that it will be used in a meaningful fashion. In recent weeks there has been a rash of UFO reports from some parts of the country, yet the press tends to fix its attention on the most extreme and outlandish cases and presents a very distorted picture to the public (e.g. reports

from people who have talked with spacemen). I am aware of other unusual phenomena observed by professional astronomers, as well as less qualified observers, which certainly merit some serious attention. The experience of watching the phenomenon I have just described — even if it should ultimately receive some satisfactory explanation as a hovering flare, or something — convinces me that attention ought to be focused on finding explanations for some of the more unusual and well-documented observations of 'UFO's.'

"Follow-up Investigation of Unusual Luminous Phenomenon of October 5:

"After writing my report on the phenomenon, I contacted APRO in Tucson and eventually spoke with C, who was investigating a series of about half a dozen similar sightings which took place on the evening in question. I subsequently made a series of inquiries to the Tucson airport and Davis-Monthan AFB to inquire about unusual phenomena on that night and the possible existence of records relevant to it, especially any records that would permit identification of the airplane I saw in the vicinity. These inquiries generally drew negative or uninteresting responses, although there was evidence that other inquiries had been made and that some information is retained on IFR flights for a period of 15 days. I obtained numbers to call both at Luke AFB and at Vandenburg to inquire about other AF operations that might be responsible, such as missile launchings or flare drops. D-M AFB disclaimed any responsibility for any operations west of Tucson.

"A call to D at Vandenburg (his number —) proved most enlightening. Upon my mentioning the purpose of my call and the date of the phenomenon, he immediately asked if it was at 8 PM. I replied yes, and he elaborated on a launch that took place at 7:53. Partly reading from a prepared account, he described the delayed launching of a Titan II intercontinental ballistic missile from the coast launching site down the Pacific test range toward Kwajalein (takes 27 min. to reach target). He explained that they had received numerous calls on this launch, although they couldn't see it themselves due to fog. In fact he had just talked to one caller shortly before I called, despite the fact that the event was more than a week and a half old. He said, reading from his document, that they call this 'the twilight phenomenon' in which launches that take place between 30 and 60 minutes after sunset produce a wide variety of spectacular phenomena which, depending on the observer's azimuth and distance, sometimes resemble a 'bluish-white cloud' and/or an orange or rosy-colored exhaust plume which catches the light of the sun when the missile is about 50 or 60 miles high west of the launch site. Such events have been witnessed from as far away as Oregon and New Mexico, he said.

"Rethinking my observations, I recognize that this kind of a launch, moving directly away from Tucson, could easily explain the fundamental characteristics of my observation (including the extreme stability in location of the phenomenon and the relative sharpness of the edges of the 'disk' which was presumably a giant cloud of smoke — the rocket plume looked at edge on). Still difficult to reconcile with such a launch are details of the 'halo' I observed, but the most unusual details I was uncertain of anyway.

"I then placed a call to B to ask for a firsthand account of her observation. I did not indicate anything about the rocket launch explanation until she completed her description, which I now summarize: She was driving west on Sunset Rd., approx. half way between Silverbell and Sunray when she noticed a 'flare or fireworks' in the western sky. She continued driving west and as she approached Sunray (about 1 minute later) she became aware of a circular glowing patch in the same location in the sky. The glow became more intense ('it just became brighter, not bigger'). She then noticed a lighter and much larger circle or halo of light surrounding the bright glow. She described the impression as looking into a big flashlight and seeing not only the central light but also light from the whole reflector. She stopped her car at Sunray and she, and the driver of a car following her, got out to watch the phenomenon. The halo could no longer be seen but the central glow grew dimmer ('less dense' and possibly slightly bigger). She then immediately went home (near the last observing location) and called A. The line was busy, evidently because I was on the phone, and she reported her observation somewhat later.

"After listening to B's narrative account, I asked some specific questions about sizes, elevations, azimuths, etc. She observed the phenomenon somewhat to the right as she looked out her front windshield while driving the car west. She estimated the angle as being approximately 12:30 on a clock face with 12 being due west and 3 due north. The elevation was 'just over the mountains'; indeed it was so low that she could see it only because of a low dip in the crest of the mountains. It was obviously her impression that the event was taking place behind (or west) of the mountains. She estimated the diameter of the central glow as being 'two-thirds the diameter of the full moon,' although she did not compare it with the moon in the sky. She had more difficulty describing the size of the halo, but explained eventually that it had a width of about 1 moon diameter and a diameter of about 4 full moons (she was describing an annulus). The duration of the entire event was the time it took her to drive about 1 mile (probably about 50 mph) followed by a 3 or 4 minute watch from the corner of Sunray and Sunset. Although she had written down the time of the event, she could not recall what it was but guessed that it was either 8 PM or 8:30. The fact that she called the A's and got a busy signal due to my call in progress around 8:15 places it close to the time of my own observation.

"In my judgment, the fundamental characteristics of the observations by both B and myself are entirely consistent with the Titan launch explanation. Minor discrepancies and details are most readily explained as the usual difficulties of perceiving and remembering an unusual, rapidly-changing phenomenon."

4.2 Cursory Accounts

CU1. "I often see an object in the sky, too distant to be resolved. Hence I cannot resolve it. So what! Any distant object that cannot be identified is by definition a UFO. But until it can be *identified* as extraterrestrial there is no

point to assuming it to be extraterrestrial. Do not make assumptions stronger than necessary. It is bad science to do so."

CU2. "It would stretch my memory beyond capacity to accurately recall the 3-5 UFO sightings I have made. In no case could I competently fill out your form.

"However, I will say, that in all instances I do not *believe* the UFO's to be extraterrestrial."

CU3. Respondent states that he made an observation during a classified experiment, and so is unable to comment.

4.3 Nocturnal Lights

These cases are subdivided into groups.

Point Lights

NL1. *Northern Ontario. Date unspecified.* Respondent observed an almost point-like source of light, yellow-orange in color, moving noiselessly across the night sky. It was followed by two jets which he could hear, and which were presumed to be chasing the yellow "ball."

NL2. *Place, date, unspecified.* Respondent saw a brief, bright flash in the night sky. At first thought that it might have been a head-on meteor. Since then students have reported similar observations.

"The probability of seeing a head-on meteor is so low that I now would consider these observations as unexplained."

NL3. *About 1955,* respondent observed a moving object or, more accurately, a lengthening "light streak" that appeared from roughly the horizon, then appeared to extend higher in the sky before fading out.

"It could have been, but this is just a guess, a meteorite making a tangential passage through and out of the atmosphere."

NL4. *Tigard, Oregon. 1950, August. 9:00 p.m. PDT.* Duration 5 seconds. Flat terrain. Weather clear, no moon, 30 minutes after sunset. Looking towards southeast for Jupiter. A bright white point source of light appeared in the southeast, about 20° above horizon. It grew in brightness to be about as bright as Jupiter (-2m) then "winked out" in less than a second. No motion detected. Object appeared to be self-luminous.

"It may have been an airplane landing light at a great distance."

TABLE for Case NL4

	a	b	c	d	e	f	g	h
Priors	.02	.2	1	1	.05	10 ⁻⁴	.03	.5
Posts	0	.8	.05	.05	0	0	.1	∞1

In list of post-probabilities, g refers to airplane landing light.

NL5. *Blacksburg, Virginia. Midnight, EST.* Mountainous country. Weather: clear air, visibility unlimited. Moon low in sky. Respondent and two students observed bright lights in the sky for about 10 minutes. The lights moved but with little angular speed. Angular size less than 5 arc minutes. Brighter than a star. Objects changed in brightness.

Believed to have been flares released by aircraft (item d in list of post-probabilities).

TABLE for Case NL5

	a	b	c	d	e	f	g	h
Priors	.007	.3	.05	.3	10^{-6}	10^{-10}	.17	.17
Posts	.001	0	0	.989	0	0	0	.01

NL6. *Ithaca, New York, 1975, August. 10:30 p.m., EDT.* Observation (about 20 seconds) made from wooded hillside on east shore of Cayuga Lake. Respondent was observing comet 1975 H (Kobayaski-Berger-Milon). An unresolved point of white light, approximately third magnitude, entered field of view, which was 20° west of North, about 20" elevation. Respondent and another witness tracked the object until it passed behind trees as it approached the horizon, last seen slightly south of West. No sound heard.

TABLE for Case NL6

	a	b	c	d	e	f	g	h
Priors	.05	.6	.001	.3	10^{-5}	$10^{-15\pm5}$	0	0
Posts	10^{-10}	.9	10^{-4}	1	10^{-8}	10^{-15}	0	0

NL7. *Mt. Laguna Observatory, California, 1975, February. Night time.* Looking through the dome slit, for a period of two minutes, observed to the southwest at elevation $80-85^\circ$ in the region of Leo a number of objects, each appearing to be a small puff of luminous gas. Each brightened by a few magnitudes (from approximately +6 to approximately +2) then faded out. The brighter puffs seemed to be more defined than the fainter puffs. There was no apparent formation. Each object was larger than a star but smaller than the moon.

TABLE for Case NL7

	a	b	c	d	e	f	g	h
Priors	.2	.6	.05	.05	.04	.02	0	.04
Posts	0	1	0	0	0	0	0	0

NL8. *Bloomington, Indiana. 1974, January or February.* Respondent writes:

"Morning shortly before dawn at observatory. Clear sky. Preparing to shut down telescope and close dome. Fleeting glimpse (<2 seconds) an object, or rather a light moving parallel to and 5-10 degrees above southeastern horizon (moving right to left). Color was yellow or perhaps red (yellow I believe). Rapid motion suggested object was fairly near but there was no noise associated with it. That's really all I can report. Sighting was not lengthy enough to permit a careful examination. I *believe* the object disappeared below tree line. A case of 'now you see it, now you don't.' I jokingly 'reported' my sighting to others in the department — we all had a few laughs. Perhaps it was the sort of thing out of which UFO reports are sometimes born."

NL9. *Fleischmanns, New York, 1962, about May 30. Approximately 9:30 p.m. EDT.* The location was in the Catskill Mountains and it was late dusk, when stars were appearing. There was a slight wind. Respondent was with a group observing the sky when a member of the group noticed a moving light. It was first seen south-southwest and disappeared towards the northwest, the elevation ranging from 10 to 20°. The object was bright (first magnitude), but no surface features could be seen. It appeared to be solid and self-luminous, the diameter being about 1/4°. There was no sound. The object appeared to be traveling approximately from the southwest to the northwest. "The motion was jerky, it followed a fairly straight path from where it was first noticed near southwest horizon till it disappeared behind mountains to the northwest. However, it was much less uniform than any satellite I had ever seen, and I could find no listing for a satellite passage around that time." No reports of weather balloons, etc. could be found in the area.

TABLE for Case NL9

	a	b	c	d	e	f	g	h
Priors			.5	.3		.01		.19
Posts		.25		.5				.25

[Respondent points out that, at the time of this event, respondent was a senior in high school.]

NL10. *Manchester, England. 1953 (date forgotten). About 9:00 p.m. GMT.* Respondent writes:

"One evening when observing the sky with a low power hand-held telescope outside my house, I noticed a very bright stationary red light at about 20" altitude (≈ 5 magnitudes brighter than Betelgeuse). At first I thought I must be seeing the lights of an approaching or receding airplane and ignored it. After about 15 minutes (observing stars), I noticed that the object had not moved and was unchanged in brightness or color. I inspected the object through my telescope

but could see no structure. As I was pondering about what the object might be (a few minutes later) it suddenly moved off at high angular speed parallel to the horizon and disappeared completely in 20 ± 5 seconds, making no noise as it moved away. I reported the sighting to the local airport (20 miles away) and asked if any weather balloons had been launched that evening (as a stab at a rational explanation). None had been launched."

The object was first seen almost due west and last seen about 15° west of north. The telescope was operated at X5 magnification and X10 magnification. The sky was mostly clear; both sun and moon were below the horizon. The object was bright red (brighter than any star in the sky) and point-like (no discernible structure). The brightness changed only when the object was apparently moving away, when the brightness decreased to the point that it was invisible to the naked eye after about 20 seconds.

TABLE for Case NL10

	a	b	c	d	e	f	g	h
Priors	.2	.2	.2	.3				1
Posts				.2				.8

Respondent notes that he assigns a small post-probability to item d since he checked at the only nearby airport and they said that no balloons had been launched.

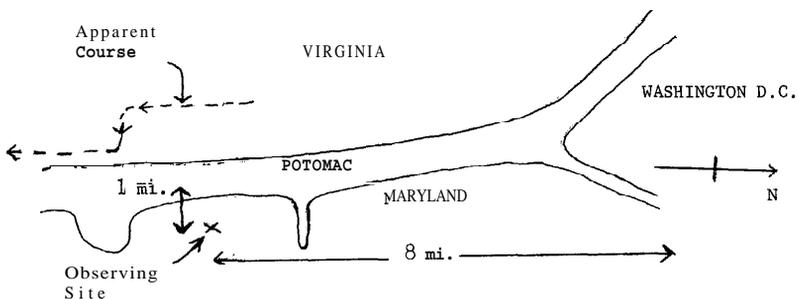
NL11. *Gainesville, Florida, 1956 or 1957.* Respondent was observing Jupiter with a small refractor telescope on the roof of the Radio Observatory of the University of Florida. "I saw a moving light in the northern sky quite low on the horizon. It made a fairly rapid crossing of the sky from west to east and then returned and vanished. It was too fast for me to catch it with the telescope. At the time it appeared to me that the light was considerably too bright for an aircraft light and also there was no sound. The light was whitish-orange (as an ordinary lamp bulb might appear in the dark). It was brighter than Jupiter (which was then close to opposition) but not as bright as Venus when at magnitude -4. The whole sighting lasted less than a minute. I might have discounted the incident were it not for the fact that around this time there was another report of a UFO seen by a number of people and photographed by the local newspaper.... As I recall the picture appeared on the front page and showed a light in the sky of the same type that I had seen. I did not personally witness this second event although I had a friend who did. (It should be noted, however, that some years later in the mid-1960's a number of colored lights were seen in the sky over north Florida in the Tallahassee to Pensacola area. These were erroneously reported as UFO's and were in fact due to chemical released from rockets in the upper atmosphere originating from Eglin Air Force Base.)"

Respondent estimates the altitude of the object as about 30° . The night was clear and mild and stars were visible. The magnitude of the object is estimated as -3.5 . The object moved steadily from northwest to northeast, made a fairly sharp change of direction, and moved steadily from northeast to northwest. It vanished suddenly while respondent was watching. The distance was uncertain but the speed appeared to be considerably faster than any aircraft. The total observation lasted about one minute.

TABLE for Case NLI1

	a	b	c	d	e	f	g	h
Priors	.125	.125	.125	.125	.125	.125	.125	.125
Posts	0	1	0	0	.3	.3	0	.3

NL12. *Maryland, SE of Washington, D.C. 1962 (?), summer, about 9:00 p.m.* Respondent writes: "... my memory of this 'event' is not very clear, since it took place about 14 years ago. I was twelve at the time, living south of Washington, D.C. and had just finished constructing a refracting telescope (1 1/2" objective diameter with an eyepiece that produced -22 power). One evening as I was testing out the telescope, I spotted a bright moving source, apparently very far away and in the west, traveling south. My house was in the approach pattern for a large airport (Washington National) so I immediately thought I was watching an airplane. The brightness and speed of the object were roughly that of an artificial satellite. (I believe that the only reason I followed the object was to discriminate between these two possibilities). I followed the object along its trajectory for some minutes without seeing blinking lights, when suddenly the object executed an abrupt right angle turn. When I found the object in my telescope again, it was climbing in the sky, obviously proceeding eastward. It made one more abrupt 90° turn a few minutes later and continued more than 1-3 seconds to complete [sic], and I know of no object that could have turned so fast. I don't remember any rapid changes of speed or color, nor any noises. The object was definitely many miles away from me."



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Fig. for Case NL12.

The observation lasted 10-15 minutes. Respondent guesses that the object was several (-5) miles away at an altitude of about 5,000 feet. The elevation varied from 20-30 degrees. The sun had set 1-2 hours before, the moon was not yet up, and the sky was clear. The object was too small to resolve. The light was white, about the same brightness as a bright star, and was steady. It may have been either self-luminous or reflecting sunlight.

The object appeared to move steadily southward for several minutes, then it executed an abrupt 90° turn and appeared to head easterly. After a few minutes on its easterly course, it again made an abrupt turn southward, eventually disappearing below the horizon in the south. The turns took only 2-3 seconds.

TABLE for Case NL12

	a	b	c	d	e	f	g	h
Priors	.15	.3	.2	.2	.05	.01	0	.09
Posts	>>.01	.3	<.01	.65	<.01	<<.01	0	.05

Light Formations

NL13. *New York City, sometime between 1957 and 1961. Evening.* Respondent was on the roof of the Pupin Physics Laboratories, probably preparing for or closing up after a telescope-observing session for students or visitors.

Respondent writes, "I saw a set of lights passing nearly overhead. The memory of this event is no longer clear, but there were three or four lights, one in back of the other, with a separation in brightness as of airplane signal lights if strung along the body of a plane. However, nothing else was visible about the object, and there was no sound. I am no longer sure whether there was a second, similar, set of lights or whether their color was white or green.

"The observation seemed to me curious but not extraordinary."

It was the impression of the respondent that the lights could have been attached to a solid object, but no outlining shape was visible. However, it is not clear whether one would have been expected. The angular size of the object was approximately the same as that of the moon. The motion was steady like that of an airplane.

TABLE for Case NL13

	a	b	c	d	e	f	g	h
Priors	<.1	.1	.4	.4	<.1	<<.1		<.1
Posts	*	.5	<<.1	.5	<<.1	<<<.1		

"*The category of 'hoax' does not seem relevant here. Although a *report* may be a hoax, an *observation* refers to some phenomenon or device, which must fall into one of the other categories provided."

NL14. *Place unspecified, about 1955.* "About 20 years ago, when I first became interested in astronomy, while observing the sky one evening at about

9:00 p.m., I observed a formation of five or six lights move across the sky from west to east in about one minute's time. After ten minutes, or less, they moved across the sky from east to west in about one minute, but this time in a V formation. Unfortunately, I was quite new to astronomy and did not 'quantify' the measurements."

NL15. *San Mateo, California. 1960, August 11, approximately 3:30 a.m. to 3:40 a.m., PDT* Letter accompanying returned questionnaire reads as follows:

"I have delayed in returning this form until I decided whether or not to include a narrative on a possible UFO sighting I experienced. Since this event happened in 1960 when I was 16, I would not classify this as a sighting by a qualified astronomer but by an avid amateur astronomer. On the night of 11/12 August 1960, I was observing the peak of the Perseid meteor shower in my backyard in the hills of San Mateo, a community in the San Francisco Bay Area. Near 3 A.M., as I was watching towards the northeast, I suddenly heard an oscillating high-pitched sound (similar to sounds heard in a science fiction movie). When I looked in the direction of the sound (toward the south east and almost overhead) with the naked eye, I saw a V-shaped formation of whitish points of light. The sound continued as the formation moved in the general direction from east to west rapidly (traversing to the western horizon in less than 30 seconds). I had time to pick up my binoculars (which were hanging around my neck) to examine the objects. However they still looked like points of light of about second magnitude. About ten minutes after this swarm had disappeared, I heard this sound again and a second swarm appeared in the same V-shaped formation and proceeded in the same direction as the first swarm. I did not report the UFO sighting but did check with the USAF and Navy to see if they had any squadrons of jets or helicopters in the vicinity at this time. They told me no (whether this was the truth or not, I do not know). I would think military aircraft would be the only type of aircraft likely to travel in V-shaped formation at 3 A.M. No reports of UFO sightings appeared in any of the local newspapers. It may be that I saw some sort of aircraft formation. However, the very odd mechanical sound which accompanied their flight still puzzles me because I have never again heard this sound coming from any type of vehicle."

The binoculars were 7 x 50. It was a clear night, the stars being visible, and the moon waning gibbous. Each group appeared to contain about 10 point sources, white in color, about second to third magnitude. Each formation was approximately as shown below:

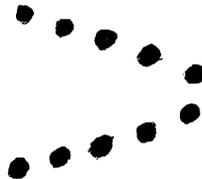


Fig. for Case NL15

There was no variation in light intensity, and the lights appeared to maintain fixed positions with respect to each other. The respondent infers that the objects were mechanically operated because of the sound and movement in formation.

Each group was traveling from southeast to southwest. The motion was steady, much faster than a satellite, but slower than a low flying aircraft. The movement was in a straight line. The formations were finally occulted by the roof of the house to the west.

Additional Comment, received June, 1977:

NL15a. *Arlington County, Virginia, 1972, April 5, 8:15 p.m.* A respondent described the following event which, he notes, is similar to NL14 and NL15: — "The first time I saw a flock of wild geese flying overhead at night, illuminated by lights on the ground, my initial reaction was that I was witnessing a UFO formation. I believe I realized they were geese when I heard them call to each other.... (In) my journal notes, I described the experience as follows: Naked eye observation, chance sighting while gardening at night. On a fairly clear night, I looked up at the sky and noted faint smoggy clouds. One wisp became a line and moved sideways at a fair clip which showed white beads like second magnitude stars. The line wiggled a bit but kept moving as a ragged, broad V with maybe eight beads in each arm, passing high overhead moving west. This was a flock of wild geese migrating north, illuminated by lights from the ground!"

NL16. *Angell Hall, Ann Arbor, Michigan. 1965. About 8:00 p.m.* Respondent writes: "As a graduate student in astronomy at the University of Michigan in 1965, I was helping prepare the Angell Hall Observatory for the start of a Public Visitor's Night shortly after dark when a fellow student who was on the roof shouted to look at the sky. I looked up through the slit in the dome and saw two red lights that seemed to be oscillating back and forth along the line joining them and moving rapidly across the sky in a direction perpendicular to that line. There was no sound obviously associated with the moving lights. The two of us in the dome watched them for about 10-15 seconds until they disappeared behind the slit, while the fellow on the roof observed them for some additional time moving to the horizon. Immediately afterwards, the three of us discussed the incident, agreed that it was very peculiar, and could not come up with any reasonable explanation. I still don't have the faintest idea of what it was."

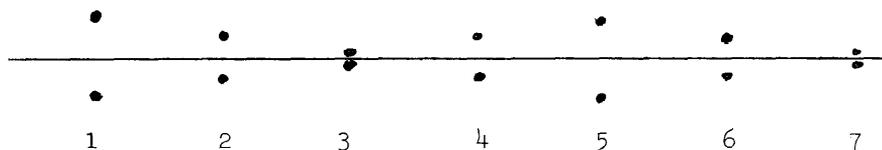


Fig. for Case NL16.

The objects were first seen to the northeast and last seen to the northwest, at an elevation of about 40° . Each object was a red point source of light. The pair oscillated in a very smooth manner in a regular pattern along the line between them as the pair moved across the sky, as if attached to a long rotating rod whose plane of rotation remained always along the line-of-sight. (Respondent considers it unlikely that the observed motion was really due to rotation of one object since it would imply a very large invisible connecting rod whose plane of rotation always contained his line-of-sight through a wide range of azimuth as it was tracked across the sky.) The period of oscillation was about 2-3 seconds.

TABLE for Case NL16

	a	b	c	d	e	f	g	h
Priors	.01	.1	.1	.2	.01	<<.01	0	.58
Posts	0	.05	.1	.5	.25	<<.01	0	.1

See also NL23.

Diffuse Lights

NL17. *Marblehead, Massachusetts, probably 1948, about 9:00 p.m.* The respondent was looking out of the window of an unlighted room on the second floor at the night sky towards the east. Stars were visible but there was no moon. "I saw a roughly spherical, self-luminous, perhaps rolling, perhaps partly transparent object move across the sky towards the observer, rising in elevation slightly. The solid angle was several degrees square. The motion was slower and it was longer lived than a meteorite and the object was not as bright. The motion was faster than an airplane. The speed was similar to that of a bird not-too-nearby." The color was perhaps greenish. It appeared to be gaseous, was fuzzy in outline, and was perhaps transparent. It also appeared to be self-luminous and disappeared while the respondent was watching. Respondent believes that it was possibly an electrical effect or ball lightning.

TABLE for Case NL17

	a	b	c	d	e	f	g	h
Priors	.03	.45	.30	.15		10^{-6}	.06	.01
Posts	0	0	.7	0	.04	0	0	.26

NL18. *Eugene, Oregon, 1966(?), spring, about 10:00 p.m.* Flat terrain, many large trees. Sky cloudy but bright. Respondent was looking at the sky to see if the clouds were going to clear. He noticed a bright light about 5° wide. It lasted about one minute and changed color as it moved. When first seen it was green (but not sure of color) and about 10° above the northern horizon. It

moved at an angle towards the horizon and changed to a red color. The object was lost in the trees as it approached the horizon. The object was fuzzy and self-luminous, being brighter than any star. As it moved, it changed shape, color and brightness. (See sketch)

The next day it was reported on the radio that others had seen the object. The object was explained in the newscast as being a small airplane.

TABLE for NL18

	a	b	c	d	e	f	g	h
Priors	.02	.6	.25	.10	.02	.001	0	.009
Posts	0	.35	.35	0	.01	0	0	.29

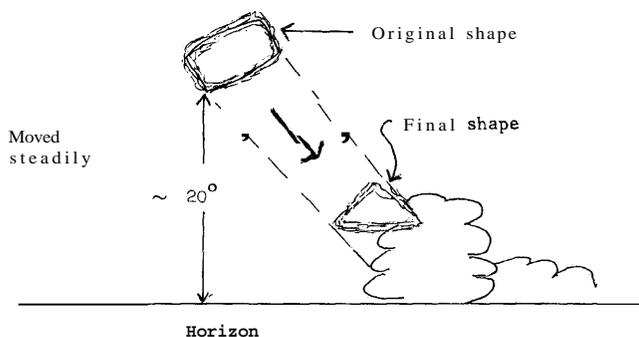


Fig. for Case NL18.

NL19. *European Southern Observatory (La Silla), Chile. 1972 December 12. About 5:00 a.m.*

Respondent writes as follows: "In the early morning of 12 Dec. 72 I was working together with Drs. M and G at the ESO 1.5 m telescope at La Silla observatory. We were trying to obtain a spectrum of the supernova 1972 in NGC 5253, and had the Cassegrain image tube spectrograph installed and in the middle of an exposure. Dr. G was actually observing through the telescope and spectrograph.

"Our attention to a bright light in the sky was called by the night assistant, Mr. B. We (M and myself) went out of the dome onto the roof to get a better view. It was about 5 AM local time. The object looked like a classic picture of a planetary nebula because the donut-shaped luminous region was centered on Venus (or another bright planet or star) at the time we first saw it.

"The green-bluish donut was transparent and drifting from South to North about 40° above the horizon. It subtended about $25\text{-}30^\circ$. By accident it passed in front of the telescope during the exposure and was verified to be transparent by G. It left no trace on the spectrogram since the specific intensity was quite low and moved quickly through the limited field of the telescope."

"From its angular drift rate, we estimated a drift velocity of 1,000 km/hr if it were an ionized cloud at 200 km above the earth."

"I gave an account of the object (which had been seen by others and reported to be an 'OVNI' or UFO) to the newspapers. This was done the day after big accounts had been published about it by so-called reliable witnesses stating it had 'landed' 80 meters in front of a police station in the Andes."

Respondent speculates that the phenomenon may have been a cloud of luminous gas caused by a burst of cosmic rays from the sun. The green-blue color may have been $\lambda 5007$ of ionized oxygen.

NL20. *Whittier, California. 1951, June, about 10:00 PDT* "I had just gone outside to enjoy a little amateur astronomy with my 3-inch telescope about 10 pm PDT on a night around the end of June 1951. After 24 years some of the precise details are hazy in my memory. When I looked to the south with my unaided eye to locate Saturn I noticed it had a 'twin' in brightness about $3-4^\circ$ to the left of it. I knew the skies well enough to know that it was not a star or planet and guessed that it was the landing lights of a distant plane. For the fun of it I decided to have a look at it through the telescope to confirm my guess. To my surprise I saw an elliptical light blue glow with a fuzzy edge. The color and ill defined edge immediately reminded me of a corona brush discharge. I was quite familiar with such discharges from years of experimenting with Tesla and induction coils. The angular size of the ellipse was similar to Jupiter which I had previously observed many times with the telescope. This meant that it was on the order of one minute of arc. The minor axis was about half the size of the major axis. There was no noise.

"I had only observed the object for a few seconds when it began to move — slowly at first but then rapidly accelerating to a rate of a few degrees/second. It moved in a straight line as far as I could tell from about 20" above the southern horizon to about 60" above the SSE horizon in a total elapsed time of the order of 10 seconds. Then it abruptly, in a second or two, faded in brightness to invisibility. I thought maybe it had moved so that our garage had blocked the light path causing the fade in light but the path was well clear of the garage and the object was lost to the unaided eye as well. There was no change in shape or size as it disappeared, just brilliance. My recollection is that the major axis was horizontal throughout and thus perpendicular to the motion but I am not very certain about this in my memory."

"Incidentally the fuzziness of the edge was definitely not due to poor telescope quality or focus adjustment. For example this telescope would show several belts on Jupiter and split the 3 second of arc doubles comprising ϵ Lyrae."

"At the time I made a calculation relating assumed linear sizes to corresponding linear velocities and concluded that the object was at most only a few feet across if it was traveling no faster than airplanes do. A repeat of this calculation using the recollected values given in this report is given in the following table:

TABLE for NL20

Assumed Size	Corresponding Distance	Corresponding Velocities
1 foot	3,000 feet	200 ft/sec
10 feet	30,000 feet	2,000 ft/sec
100 feet	300,000 feet	20,000 ft/sec

Relations used: $d = x/\alpha$

$$v = \frac{\beta x}{\alpha t}$$

d = distance in feet

x = assumed size in feet

α = angular size in rad $\approx 3 \times 10^{-4}$

β = angle moved thru in rad ≈ 0.7

t = time to move thru angle $\beta \approx 10$ sec."

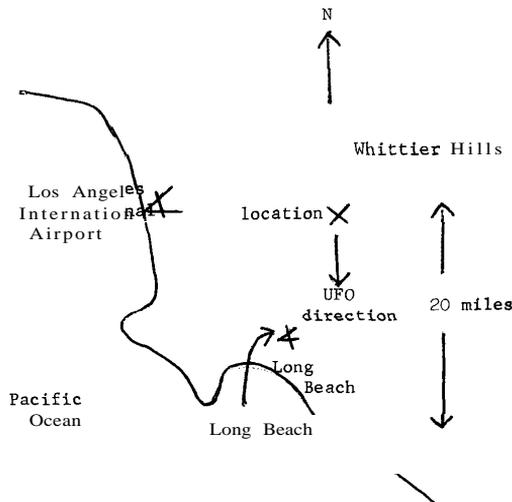


Fig. A for Case NL20.

The telescope used by the respondent was a 3-inch f/13 reflector at about 50x. The night was clear and stars were visible. Respondent has no recollection of the moon being up. Respondent describes the object as elliptical, light blue in color like electrical corona, with no surface features. The sketch below reproduces his sketch showing the shape and fuzzy boundary. The object appeared to be gaseous or solid with a gaseous outer layer. No sound was heard. It appeared like a bright star to the unaided eye, but fuzzy through a telescope.

It appeared to be self-luminous. Its motion was a steady acceleration — no wobble, no waving or jerks. The respondent's recollection is that the major axis of the ellipse was parallel to the ground throughout but he is not quite sure about this."



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[This sketch is intended to depict an elliptical glow with no features except a diffuse edge.]

Fig. B for Case NL20.

"Searchlight on Cloud" Effect

Three respondents described observations which suggested a searchlight playing on a cloud when the conditions precluded this being the real explanation. See also DO 9 for a somewhat similar day-time event. Their accounts follow:

NL21. *Buffalo, New York, about 1960.* Respondent writes:

"On one night about 1960, when I was a high-school student, I was observing with my 10-inch telescope from my backyard in Buffalo, New York. (I do not have the date at hand as I write this, but it can be obtained from an entry I made in my observing log at the time.) I did *not* have my eyeglasses on at the time (I am slightly near-sighted in my left eye, and considerably so in my dominant right eye). I witnessed a patch of light, like a searchlight spot on a cloud, pass from northwest to southeast and disappear about 10° above the SE horizon. But the sky was exceptionally clear for Buffalo, so the phenomenon could not have been a searchlight on a cloud. Despite the fact I did not have my glasses on, the phenomenon appeared much too distended to be a balloon or aircraft (no sound accompanied the event). I have no explanation for the event, but lack sufficient details to make the observation more than a curiosity."

NL22. *University of Florida Observatory, Gainesville. Approximately 1952. 7:00 p.m.* Duration: 30 seconds. Flat terrain. Dusk, sun $12''$ below horizon, no moon, clear sky, stars visible. Respondent and a colleague were setting up telescopes for an astronomy laboratory. Respondent looked to northeast and saw, about $40''$ up, a rapidly moving elliptical light $1\text{--}2''$ on its major axis. It was sharply outlined but looked more gaseous than solid. Object made several looped orbits in a small area of the sky and then suddenly faded out. Appeared to be self-luminous. It looked very much like a search light playing on the bottom of a cloud layer. The problem was that the sky was perfectly clear — no clouds.

Respondent has no explanation to offer.

TABLE for Case NL21

	a	b	c	d	e	f	g	h
Priors	0	.2	.3	.4	.09	.01	0	0
Posts	0	1	.4	.1	.4	.01	0	0

NL23. *Forty Fort, Pennsylvania. 1966, August 11. Between 8:00 pm (EDT) and 1:00 am next day.* Sighting lasted about 3 minutes. "On the evening of August 11, 1966 (it may have been 1965, I have no record) I was observing the Perseids. The sky was partly cloudy. The observations were being made in Forty Fort, PA (NE part of the state). At some point I realized that a disk of light, perhaps 1° in diameter was flashing, visible against the edge of a cloud. Puzzled by it at first, I decided to check to see if it was a reflection from a nearby airport light. It was not. The disk flashed on for an instant about every twenty seconds, roughly the period of the airport light (I had no timer), but they were clearly out of phase. Immediately preceding each of the last three flashes before the disk stopped I saw a swarm of what looked like meteors (definitely not Perseids) fly low along the Southeastern horizon. They seemed to be a few lights flying almost 'in formation' in each case. It struck me as a remarkable coincidence that so many meteors should follow the same trajectory, clumped into a period identical to that of the mysterious light. I never reported this incident for two reasons. First, having made no notes, the accuracy of my recollections must be held suspect. Second, it is too easy to think of this incident as explained by simple events (e.g. someone shining a powerful flashlight on the cloud) made peculiar only by the coincidence of their having happened together."

The flashing light was almost overhead, slightly to the northwest. The meteorlike swarms were first seen towards the east and last seen towards the southeast. The maximum elevation of the swarms was about 20° . There were a few clouds in the night sky, and stars were clearly visible (to about magnitude 3); neither sun nor moon was in the sky. "There is a private airport about 200 yards east of where I was standing. An Air Force Center of some sort is also located at that airport." Each of the three swarms contained three to six objects moving in unison, in formation, something like:

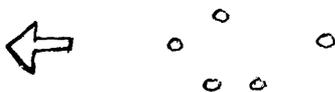


Fig. A for Case NL23.

The objects appeared to be similar to each other. "They looked just like meteors. Only the pattern, i.e. several in a swarm and all swarms following apparently the same course, plus their conjunction with the flashing light, makes them unusual. (Note that they are *not* coming from the Perseid radiant.) The

flashing light looked just like a spotlight reflected from a cloud. It flashed at an interval of about 20 seconds *out of synch* with the airport light." The objects in each swarm appeared to maintain fixed positions relative to each other. The objects appeared to be solid, were apparently self-luminous, and looked like meteors. There was no sound; to the best of the respondent's recollection, they left no visible trail. A guess of the size of the flashing light is about 500 feet in diameter. The swarms seemed to move in a northeast line and their motion was steady, with a speed thoroughly consistent with that of meteors. The speed of the swarm is estimated at about 20°/s. The swarms disappeared by going below the horizon. The flashing light disappeared when it flicked off as usual and then failed to reappear.

TABLE for Case NL23

	a	b	c	d	e	f	g	h
Priors	.008	.8	.03	.15	.01	.001		∞01
Posts	.005	1	.2	.2	.2	.095	0	.2

Disks

NL24. *Place unspecified. 1965 or 1966, summer.* Event described as follows: "My wife, another woman, one of my children and I were heading east shortly after sunset in August. We *all* observed a silvery, disc shaped object moving south. It had bluish-green lights at the rim and a red light at the center. The entire event happened so quickly it was impossible to judge size, altitude or similar parameters. It passed over the road we were traveling on and then 'instantly or very rapidly' headed eastward and became a white star-like object (-2 mag) hovering perhaps over a nearby aerospace company plant. We, meanwhile, had accelerated to 70 or 80 mph but could not gain on the object. Suddenly it headed due south and disappeared over the horizon of the Atlantic ocean. The entire encounter took place in a period of 10-15 minutes. The local newspaper carried a report from a housewife and several neighbors, located about 5-6 miles southeast of us, also reporting the UFO."

"I hate to say it, but it was a classic UFO — 'flying saucer' event."

NL25. *Park Hills, Kentucky. 1954, August. 10:30 p.m.* Weather: clear night, stars visible. Mixed terrain: hills and valleys. Respondent returning home on a warm clear night in a dark suburban neighborhood. About 20 seconds after getting out of car, his attention was attracted to the zenith. A uniform, bright, white disk moved at a very high rate of speed. The entire incident lasted perhaps 3 or 4 seconds. Object was well defined and seemed to be solid. It was self-luminous, uniform across the entire disk, brighter than the moon. Apparent size, about 10 degrees. Moving from west to northeast at an altitude of about 500 feet. Estimated diameter, about 100 feet. No sound. The object disappeared while the witness was watching it; there was a "sharp cutoff."

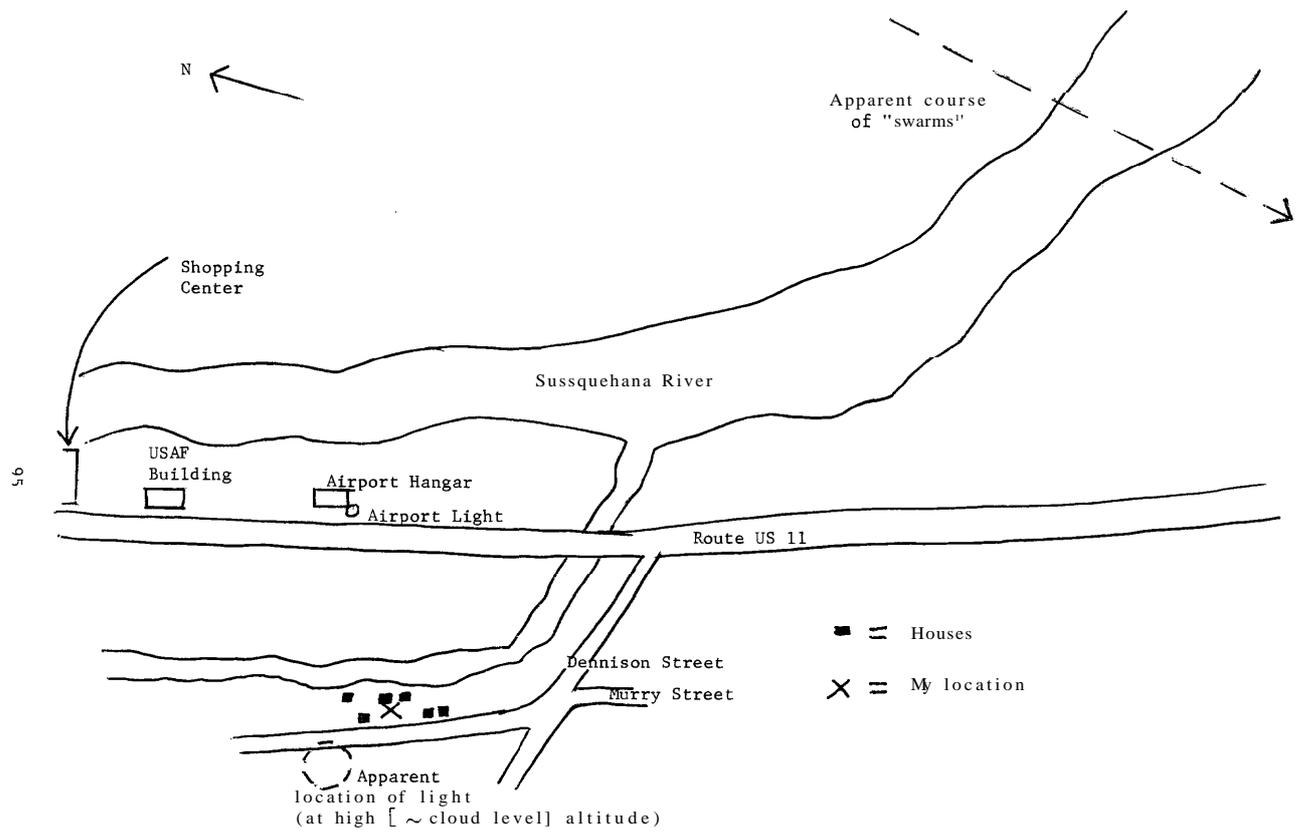


Fig. B for Case NL23.

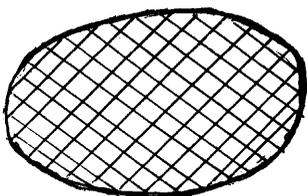


Fig. A for Case NL26.

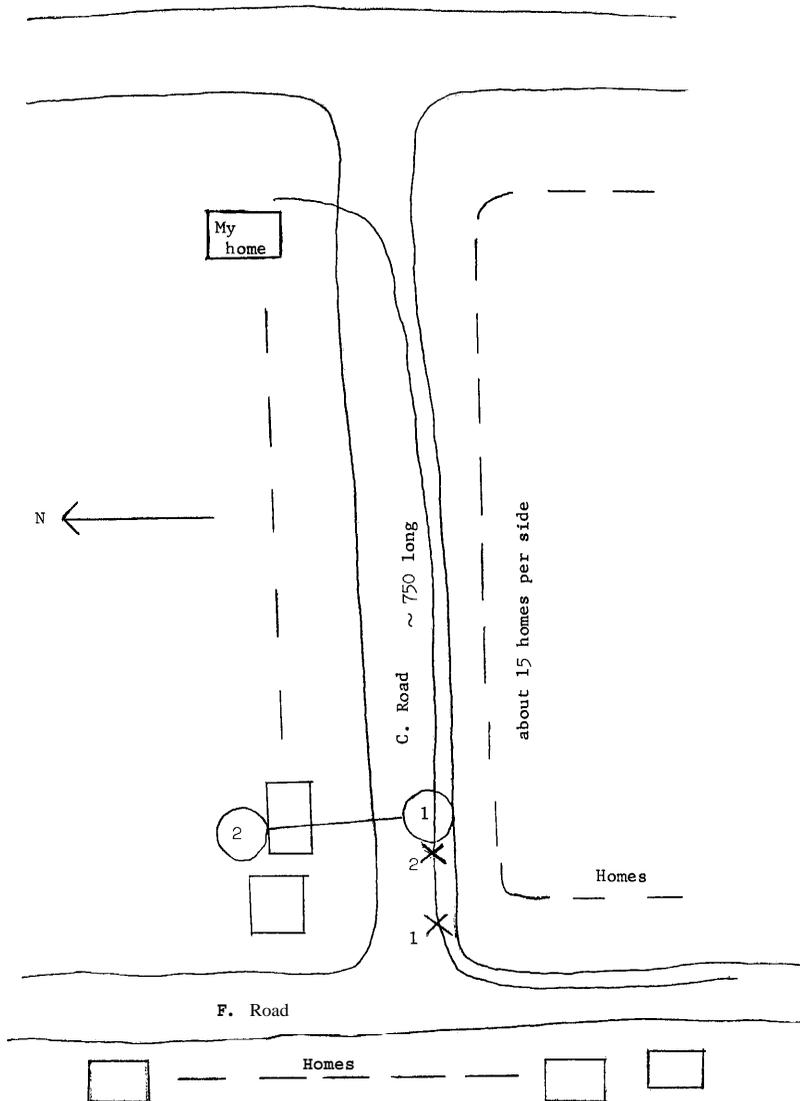


Fig. B for Case NL26.

The object was self-luminous and appeared to be more gaseous than solid. Its angular diameter corresponded to a 6 inch diameter at arm's length. The motion was described as being a steady descent from 50 foot altitude to below the roof line of two-story houses 125 feet away. The object banked to its right 20-30°. The speed was estimated as 30 feet/second, since it appeared to travel 150 feet in about 5 seconds.

TABLE for Case NL26

	a	b	c	d	e	f	g	h
Priors	.01	.05	.35	.35	.05	.01	0	.18
Posts	.01	1	.1	.1	.05	.02	0	.62

NL27. *Lawrence, Kansas, 1963, November 11, about 12:30 a.m.* "The 'object' was in sight for -10 sec. It was first seen directly overhead, and moved straight south until it was lost in the horizon haze. Its maximum angular diameter was about 5 degrees (as judged by comparison with Orion's belt). It made no sound. It appeared to be a group of small, circular, rather dim white lights arranged in a disc shape. Its direction and speed did not change while it was in sight. The night was cloudless and, as I remember, there was no moon up, though this could be easily checked in an almanac. There were no other witnesses."

Respondent was observing from the roof of a university building. He glanced at the sky as was his habit on leaving the astronomy classroom, the door of which opens onto the roof. He observed the object for about 10 seconds. It was first seen in an easterly direction and last seen towards the south. The sky was clear and stars were visible but the moon was not up. There was no wind. The object was not seen very clearly. The limiting factor was the dimness of the object. The object appeared to be round when overhead and ellipsoidal when near the horizon. Its color was white or 'neutral'. No point sources of light were visible: the object was uniformly illuminated, perhaps by reflected light (but this is speculation).

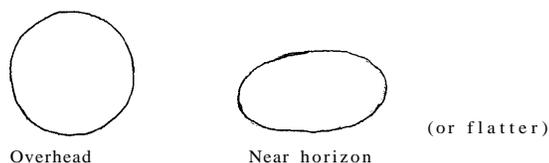


Fig. for Case NL27

The change in shape as the object moved toward the horizon is consistent with a solid disk-shaped object moving away from an overhead position. The object appeared to be solid but it made no sound. It was not quite sharply out-

lined, being somewhat fuzzy. It is not clear whether it was self-luminous or reflecting. The object became progressively dimmer as it moved toward the horizon. A *guess* of the size of the object is 15 to 30 feet. It moved steadily straight south from overhead to a point near the horizon where it disappeared in the horizon haze. The speed of the object is estimated to have been about 135 mph, based on the assumption that it was 30 feet across, which means that it was about 350 feet overhead (assuming an apparent diameter of 5°). If it disappeared 10" above the horizon and was in sight for about 10 seconds, the law of sines gives the path length (while in sight) of about 2,000 feet and simple division gives the speed. *If* the object were 60 feet across, the speed was about 270 miles per hour; if 15 feet, about 65 miles per hour, etc.

TABLE for Case NL27

	a	b	c	d	e	f	g	h
Priors	.01	.2	.2	.4	.1	.01	.04	.04
Posts	.05	.05	.2	.5	.05	.05	0	.1

Item g in the list of "priors" is specified as "military (or other terrestrial 'secret' organization) test device."

Additional Comment received August, 1977.

"More should be made of the inconsistency of my first impression of a 'group of lights,' and my *memory* of the event, an evenly illuminated disk. Which is the more accurate, I could not now say. It is safe to say that I remain puzzled by the whole affair — and probably will for the rest of my life!"

Miscellaneous Shapes

NL 28. *Media, Pennsylvania. 1948 or 1949, Summer.* Night time. Stars visible. Hilly terrain. Sitting outside with friends on the shore of a reservoir lake, respondent saw a round light "turn on" in the northwest (altitude 40°) and move slowly to "set" in the west (altitude 15°). Object looked like full moon, two-thirds diameter of moon. It had sharp outline and seemed solid. Self-luminous, same brightness as full moon. No sound. Object moved with steady motion, covering about 90° in about ten seconds. Object disappeared behind a hill.

Respondent was interviewed by Air Force intelligence officer.

Respondent first thought it was a large meteor. There were three other reports "all to the east," and a friend five miles north saw it to the south. Respondent speculates that the phenomenon may have been caused by the reflection of the headlights of a car moving up and then over a nearby hill, but adds that nothing similar was seen although a good many cars use that road.

TABLE for Case NL28

	a	b	c	d	e	f	g	h
Priors	0	0	0	0	1	0	0	0
Posts	0	.25	0	0	0	.25	0	.5

NL29. *Walkerton, Ontario, Canada, 1960, summer (possibly mid-July). About 2:00 a.m.* The respondent had been notified by his uncle (a newspaper photographer) who had been requested to obtain a photograph by the Ontario Provincial police. The following events were witnessed by the respondent, his brother, his uncle, and about six police officers, who had been "chasing" the unknown object for about an hour.

The following transcription of the respondent's report is reproduced by permission from "The UFO Experience — A Scientific Inquiry" by J. Allen Hynek (Henry Regnery, Chicago, 1972, pp. 47-49).

"We followed country roads until we came within 100 yards of the object. It was hovering around a large tree, which stood alone in the center of a cultivated field. The tree was about 100 yards distant and about 120 feet high. The object, which subtended an angle of $1/4$ degrees (giving it a physical diameter of less than 3 feet), appeared circular in shape and was thus probably a spheroid. It was highly luminous against the dark sky background and changed color through the whole visible spectral range with a period of -2 seconds (rather an irregular period). Because it was rather bright, I may have slightly overestimated the angular size, and 114 degrees should perhaps be considered an upper limit. A lower limit would certainly be 118 degrees.

"The object appeared to be examining the tree rather closely. It circled the upper branches, ranging from 50 to 100 feet off the ground, passing *in front of* the tree, then clearly visible *through* the branches on passing behind the tree again. It continued this apparent 'observation' of the tree for several minutes while we watched. Then, anxious for a picture, we climbed the perimeter fence and started slowly toward the tree facing due west. We had not gone more than 10 feet before it 'noticed' us and, noiselessly accelerating at a very high rate, headed almost directly south, disappearing over the horizon (on a *slightly* rising trajectory) in about 2.5 seconds. (I consider my length and time estimates to be quite reliable as I was actively engaged in track and field at the time and thus quite competent at this type of estimation. Even under such exceptional circumstances, these figures are most probably within ± 20 percent.)"

"Several observations about the object:

1. It was certainly too small to contain human life;
2. It had no apparent physical surface features apart from the circular shape it presented — possibly because the 'surface' was highly luminous;
3. It moved *deliberately* and *purposefully* in its 'inspection' of the tree, pausing slightly at apparent 'points of interest' and giving the distinct impression of 'intelligent' behavior;

4. Its motion was completely silent, even the final rapid acceleration;
5. It was definitely *not* any natural physical phenomenon I have ever encountered or read about (I'm sure you are familiar with what I refer to — 'marsh gas' and the like);
6. It was definitely *not* a distant astronomical object. It was clearly visible alternately through the branches of the tree and *obscuring* the branches of the tree, fixing its distance quite exactly;
7. It was definitely seen by competent witnesses (including several police officers) besides myself;
8. On acceleration from the tree it almost certainly should have exceeded the speed of sound. There was no acoustical disturbance whatever. (My uncle attempted to take a picture of it as it accelerated, but the result was not good enough to publish due to our excessive distance from the object and its rapid motion, which combined to produce a very faint blurred image.)"

"The salient points to consider are these: the object appeared to be governed by some intelligence, and it did not behave as would a physical phenomenon as we understand it."

The respondent adds the following comments: the object appeared to be solid (it kept its spheroidal shape very well). The speed of the object on leaving the area is estimated to be above 2,000 mph. A photograph was taken and sent to a UFO investigator 15 years ago; its present location is unknown.

TABLE for Case NL29

	a	b	c	d	e	f	g	h
Priors	0	0	0	0	.01	.05	.15	.79
Posts	0	0	0	0	0	.3	.7	0

Concerning the priors, the respondent states that a - d should not affect astronomers. Concerning the posts, the respondent specifies g to be "essentially non-physical phenomenon with physical manifestations."

NL30. *Albany, New York, Fall 1952 (± 1 year), about 9:00 p.m. Duration approximately 30 sec.* "The incident occurred when I was about 13 years old. I had at the time a small telescope, and was in my backyard around 8:00-9:00 p.m. on a fall evening. I was at the time quite familiar with the sky, and had done a fair amount of amateur observing. Clouds were moving in from the west, but it was clear to the east, and I recall that I was setting up on the Andromeda nebula. I saw a crescent shaped, smoothly lit, white object move from south to north over I believe a clear area of sky. Angular diameter I would now guess was about 2 times that of the moon, though this figure is not accurate.

The rate of motion was fairly rapid, covering from about 20° (?) in perhaps 15 or 30 seconds. I had binoculars (3 times) on it — the object was entirely featureless, and no sound was heard. Appearance roughly as below. I have never found a satisfactory explanation for it, and I am still curious."

The object is described as sharply outlined and appeared to be solid.

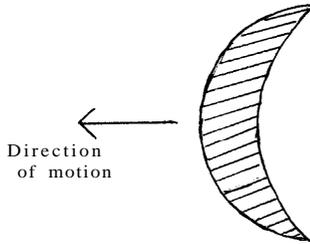


Fig. A for Case NL30.

TABLE for Case NL30

	a	b	c	d	e	f	g	h
Priors	.05	.1	.4	.4	.05	10^{-6}	0	0
Posts	0	.05	.45	.45	.05	10^{-10}	-	

NL31. *Princeton University, New Jersey. 1969, -April. About 9:00 p.m.*

Respondent writes:

"While an undergraduate at Princeton during the spring-break of 1969, I walked out of my room at -8-9 p.m. to go to the gymnasium where decorations were being set up for some activity. I noticed a brightly-lit, low flying object which was silent in its motion. The object was relatively small having a platform -10 feet in extent (horizontally) with a 'radar-like', rotating antenna atop. The bottom of this platform was bright with a yellow color but no noise was heard as the object flew a bit over tree-top level from W to E at slow speed (-10 mph). It traveled in a straight line until a tall building occulted it.

"I phoned campus and town police; both of which had received no other reports of UFO's that night. I've never understood the nature of what I saw, but considered that the object might have been a vehicle from the Forrestal Research Center (east of the university)."

The observation lasted about 10 minutes. It passed overhead apparently at tree-top level. The respondent has forgotten the detailed shape of the base platform, but provides a sketch, (Fig. B).

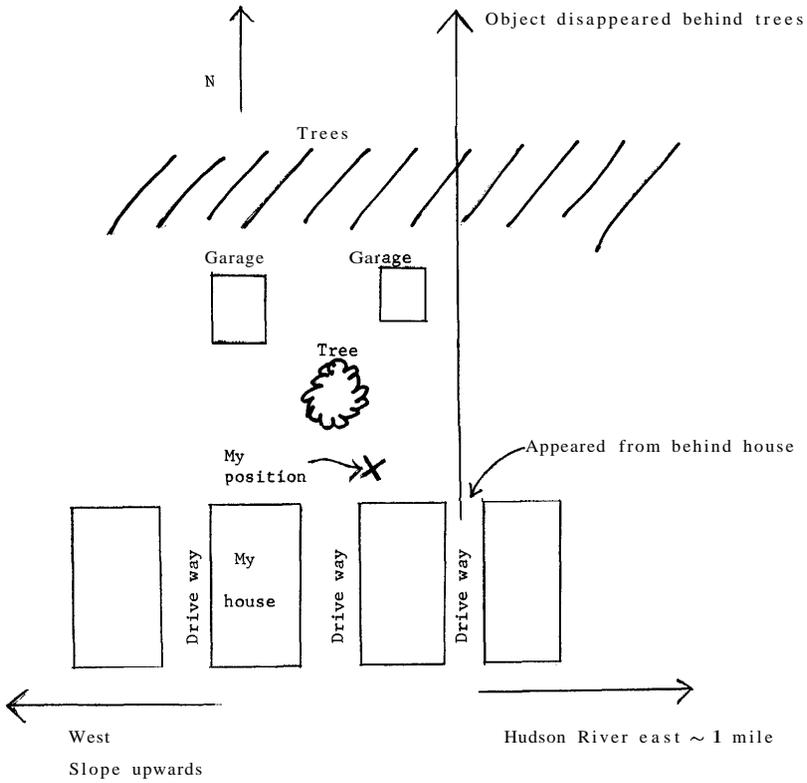


Fig. B for Case NL30.

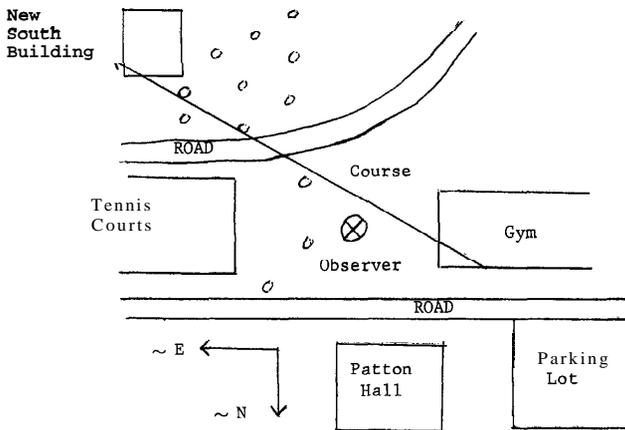


Fig. A for Case NL31.

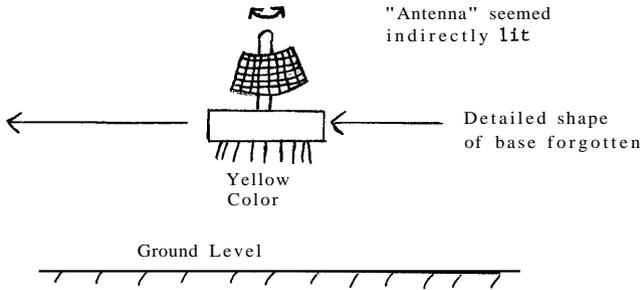


Fig. B for Case NL31.

The object was sharply outlined, was brighter than the moon (self-luminous), and appeared to be solid. The "antenna" was observed to rotate. When closest to the respondent, it was the size of a volleyball at arm's length. Trajectory was steady and appeared to be straight and at a constant altitude.

TABLE for Case NL31

	a	b	c	d	e	f	g	h
Priors	.15	.5	.05	.15	.05	.05	0	.05
Posts	0	0	0	.8	0	.2	0	0

NL32. Newark, Delaware. 1973, October 19. Approximately 11:27 to approximately 11:32 p.m., EDT.

"I was with two astronomy students on the roof (observing platform) of the Physics Building on the campus of the University of Delaware. We had a 4-inch diam. refractor on a maneuverable alt-azimuth mounting. It had turned cloudy so we were just standing talking. Because several UFO's had recently been reported in nearby areas our conversation turned to that subject and ways that UFO's could be faked — hot-air balloons, etc. A bright yellow object rose from slightly east of south (tree and buildings horizon). It silently moved northward. It was in the sky 4 to 5 minutes, fading away in the north (I didn't make a note of the altitude at which it was last seen but I would guess now approximately 30 to 40 degrees). It was easily tracked in the telescope except when high in the sky (it passed perhaps 20"-30" east of our zenith) where its angular motion was most rapid. My guess at the angular size (length) when highest in the sky is approximately 112 deg. This is probably not in error by more than 50% because I know the angular diameter of the telescope field to be 314 deg. although I did not get a good telescopic view while it was highest in the sky. My uncertain recollection is that the brightness when overhead was similar to that of a quarter moon. The 9,500 ft ceiling for the 80% cloud cover, as reported by the Weather Bureau and Flight Service, limits its distance from us because it was definitely below the clouds when it passed us. The clouds

seemed to me to be moving from west to east, certainly not south to north the way the UFO was moving. Ground wind direction I don't recall.

"Having been talking about UFO hoaxes, we were relatively unexcited by the event. My supposition is that it was a student (?) hoax perhaps of the hot-air balloon type rising from south campus and drifting northward as it gained height."

The respondent's sketch is reproduced below:

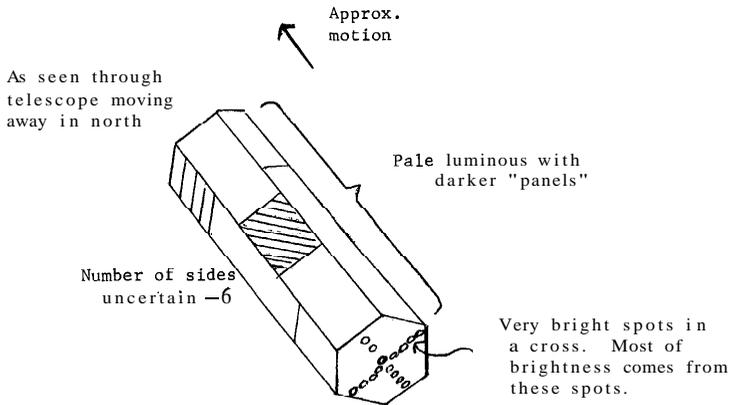


Fig. A for Case NL32.

The weather was described as having been fairly clear, but the cloud cover having increased to nearly overcast, the group was preparing to leave. The moon was not in the sky. The object appeared to be solid and sharply outlined. It was self-luminous and brighter than any star: when highest overhead, the object may have been as bright as the quarter-moon. The object was traveling from south to north and its trajectory seemed constant, but the object's altitude appeared variable as if it were drifting or swaying. The object appeared to fade away: one of the naked-eye observers felt that it faded rapidly but, looking through the telescope, the respondent felt that the fading was gradual.

In addition to the two students at the same location, another student and his friend observed the object independently from the location indicated in Fig. B.

TABLE for Case NL32

	a	b	c	d	e	f	g	h
Priors	.3	.2	.12	.15	.11	.08		.04
Posts	.85	.04	.01	.07	.01	.01		.01

[The fact that the final directions quoted by both groups of observers are in good agreement indicates that the object was last observed at a distance of

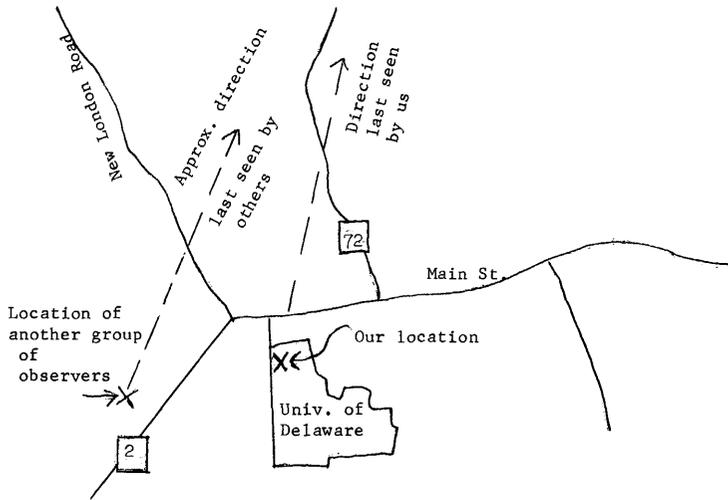


Fig. B for Case NL32.

about 2 miles. This would indicate that the total distance traveled by the object, while it was observed by the first group, was 3-4 miles. Hence it was moving from south to north with the speed of 36 to 48 miles per hour. This may be compared with the statement that "surface wind was not noticeable. I believe clouds (9,500) feet) were moving approximately west to east."]

Ejecta

NL33. Burlingame, California. 1973 (date forgotten). 7:30 p.m. PST.

Respondent writes:

"Since the phenomenon I observed was, at the time, thought to be explainable, I did not note it in my diary as a UFO sighting. In my mind I suggested a couple of possible explanations of the phenomenon — although a bit 'unusual.' Hence I made no note of the event as to date. Nevertheless the observation is still quite clear in my memory; here it is:

"While looking through a pair of Zeiss 8x30 binoculars early evening (around time of astronomical twilight) I noticed in the field of view a 'moving star-like object' — I estimated the magnitude to be about 3 — object was noticed first in binoculars — could also be seen without binoculars but not easily seen (twilight). Object was moving southward at a rate which would be suitable for an artificial satellite in polar orbit. I have observed satellites before, so this did not seem unusual, at first. As I followed it, its elevation became lower as it moved southward — as would occur with an artificial satellite in polar orbit. When it was at an altitude of approximately 15 deg. above the south horizon I noticed (through the binoculars) some — what appeared to be — sparks flying down from the satellite! These 'sparks' were not visible without

the binoculars. It looked as though fire embers were being swept overboard from an open door of an airplane. I thought of several explanations: (i) helicopter dumping fire; (ii) aircraft engines on fire and pieces falling away, (iii) 'fire particles' being discharged from a satellite. I could see no 'form' of the craft — only the light (starlike object) and the 'embers falling.' Observation through glasses lasted about 5 minutes, perhaps 2 minutes with no embers and about 3 minutes with the falling embers."

The observation terminated when the object disappeared into the haze of the southern horizon. It was first seen slightly north of east and last seen slightly east of south. The sky was clear: there were no clouds and no moon and third magnitude stars were faintly visible. The object was "starlike," about third magnitude, like an artificial satellite or a light on a high-flying jet plane. The sequence of observations is shown schematically below.

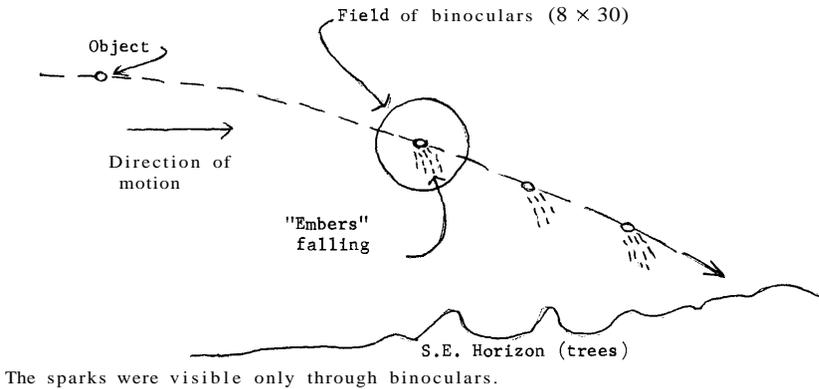


Fig. A for Case NL33.

TABLE for Case NL33

	a	b	c	d	e	f	g	h
Priors	.143	.143	.143	.143	.143	.143		.143
Posts	0	0	0	0	0	0	1	0

Concerning item g (post-probability list), respondent identifies this as: (i) artificial satellite ("discharging sparks"); (ii) jet plane with engines on fire; (iii) helicopter dumping fire.

He further adds: "Since news radio, papers, etc. did not mention (ii) or (iii), I *presume* that object was some military satellite discharging payload, etc. (camera package), etc. I understand that some "spy satellites" discharge camera packages which are retrieved by Air Force down near Vandenberg AFB — near Santa Maria."

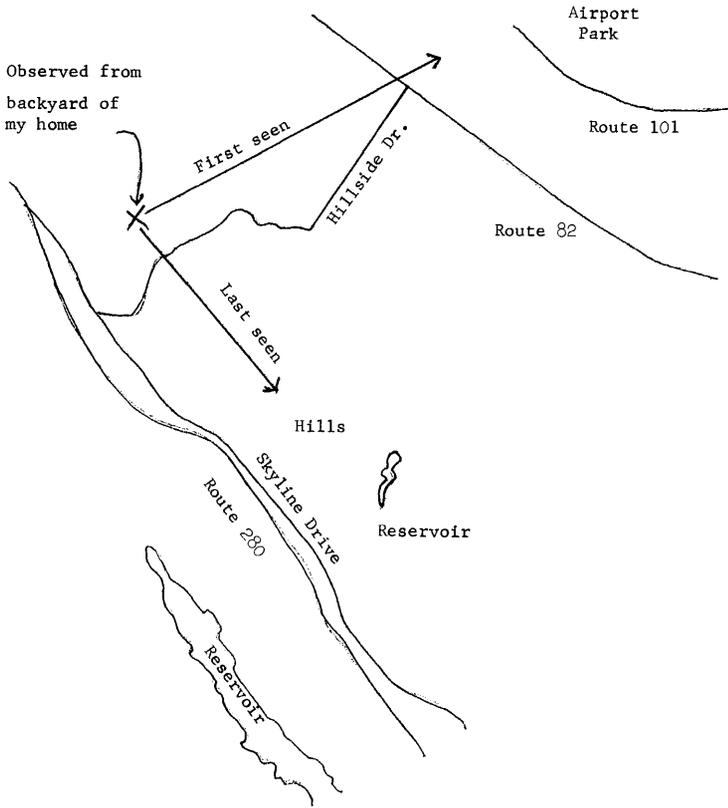


Fig. B for Case NL33.

NL34. Louisiana State University Student Observatory, Baton Rouge, Louisiana. 1971, October 10. 7:55-8:20 p.m. Respondent provides the following account:

AN ACCOUNT OF AN UNIDENTIFIED FLYING OBJECT

In the fall of 1971, I was a graduate student at the Louisiana State University Department of Physics, in Baton Rouge. On certain evenings the student observatory would be open to visitors, and on one of these evenings, I happened to be conducting the tour and open house.

"The sighting occurred on or about October 10, 1971, from 7:55 to 8:20 p.m. It was witnessed by two senior students and several of the visitors. At about 7:55 p.m., I noticed a bright object of about third magnitude, East-Southeast, roughly 10° above the horizon. Within a minute or two I recognized it to be out of place and also slightly moving. Since it was too low in the sky, I could not look at it with the observatory telescope, but I had a pair of field binoculars handy with which I did look."

"The object being spherical in shape, had a bicolor appearance, blue on the upper portion and orange-white on the bottom half. After being stationary for about three minutes, the object described a zig-zag pattern, abruptly and erratically, rising to about 20" off the horizon, now directly East. Again, after being stationary for about three minutes, the colors and brightness became more brilliant and a zig-zag pattern was again displayed. The object then moved at a high speed, its color changing to a blue-white, toward the horizon, directly South. The object could be estimated as being anywhere from thirty to one hundred miles away, depending upon its real size and intrinsic brightness."

"The object returned eight to ten minutes later, at about 15" above the horizon toward the Southeast. After two to three minutes it again described the erratic zig-zag pattern as before, coming to about 20-25° above the horizon, again directly East. At this point, the object started to emit small spherical objects roughly 1/20 the size of the original object. The color of these objects was identical (bicolor) to the larger object. After emitting several of these smaller objects in a Northeasterly direction toward the horizon, these objects disappearing at a high speed, the original object, accompanied by two of the smaller emitted objects, moved at a high speed, erratically in a zig-zag pattern, toward the horizon, southward, finally disappearing."

"These appearances were witnessed by roughly a half dozen people at the observatory at the time. Inquiring at the local airport about other possible sightings produced no positive results, and the incident was not reported since further possible development could not be foreseen."

The witnesses jointly estimated that the distance was about 30 miles, leading to an altitude of 5 miles. The sky was clear, and the moon was almost 180° from the object. The three objects moved together as shown:

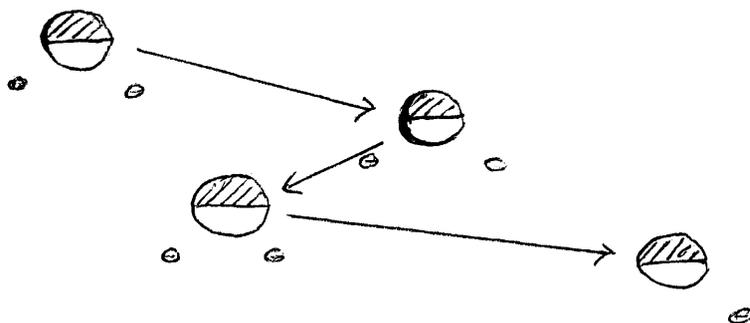


Fig. A for Case NL34.

First the single object, and then all three objects, were spherical in shape and had a bicolor appearance, blue on the upper portion, and orange-white on the bottom half:

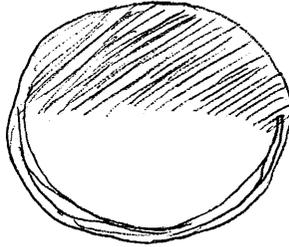


Fig. B for Case NL34.

The three lights maintained a fixed position relative to one another, and may have been attached to a solid body. The objects were briefly obscured by a building in the course of their movement, and disappeared by going below the horizon.

TABLE for Case NL34

	a	b	c	d	e	f	g	h
Priors	1.25	.125	.125	.125	.125	.125	.125	.125
Posts	0	.175	.175	.175	.1	.175	.1	.1

Item g is taken to be "a misinterpreted phenomenon."

See also Case PH7.

Electromagnetic Effects

NL35. *Near Westford, Massachusetts. 1964, Midsummer, about 10:00 p.m. EST.*

"While driving home with family from dinner in Lowell, Mass. on route 495 heading west near Westford, Mass. ~10:00 p.m., observed flash of light near horizon to south (left of road) ~5 miles or so away — flash accompanied by disruption of electrical system of car for a second or two, and of car (only one) approaching from west (lights blinked out) — *no* electrical storms or cumulonimbus clouds or radar echoes in the Boston area the entire night. Sky was clear and everyone in car was sober. Event observed by my 4 children, their mother and grandmother."

The flash, which was first thought to be lightning, lasted perhaps 5 seconds but was vivid for a fraction of a second.

"The lightning-like flash on the horizon, in very low atmosphere, was accompanied by momentary disruption of electrical circuit in my car — lights off and radio out for about a second — headlights on approaching vehicle (only one near) blinked out at the same time. Thought it was lightning but sky clear — checked weather observations, radar maps etc. (I am a meteorologist) —

there were no thunderstorms or cumulus type clouds within one hundred miles of Boston area that evening." No sound was heard.

TABLE for Case NL35

	a	b	c	d	e	f	g	h
Priors	1	1	.2	.1	.3	0	0	.2
Posts	0	.2	.3	.2	1	.1	0	1

See also Case D010.

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