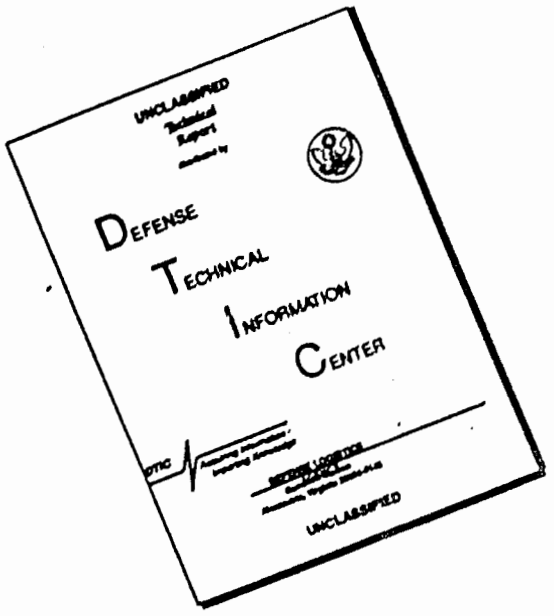
AD NUMBER
ADA800318
CLASSIFICATION CHANGES
TO: **UNCLASSIFIED**
FROM: **RESTRICTED**
LIMITATION CHANGES
TO: **Approved for public release; distribution is unlimited. Document partially illegible.**
FROM: **Distribution authorized to DoD only; Administrative/Operational Use; 30 APR 1949. Other requests shall be referred to Department of the Air Force, ATTN: Public Affairs Office, Washington, DC 20330. Pre-dates formal DoD distribution statements. Treat as DoD only. Document partially illegible.**
AUTHORITY
E.O. 10501 dtd 5 Nov 1953; DDCTC ltr dtd 3 Nov 1971

A.T.I 155448

DISCLAIMER NOTICE



THIS DOCUMENT IS BEST QUALITY AVAILABLE. THE COPY FURNISHED TO DTIC CONTAINED A SIGNIFICANT NUMBER OF PAGES WHICH DO NOT REPRODUCE LEGIBLY.

MAPPING, CHARTING AND RECONNAISSANCE RESEARCH LABORATORY

FINAL REPORT
PROJECT 364

PREPARED BY DR. J. ALLEN HYNEK
ASSISTED BY HARRIET R. SUMMERSON

THE OHIO STATE UNIVERSITY RESEARCH FOUNDATION
PROJECT NO. 364

for

U. S. AIR FORCE AIR MATERIEL COMMAND
WRIGHT-PATTERSON AIR FORCE BASE, DAYTON, OHIO
Contract No. W33-038-1118

Columbus, Ohio,
April 30, 1949

Copy No.___

APPENDIX B

Prof. J. A. Hynek - Final Report, Project 36

REPORT ON UNIDENTIFIED AERIAL AND CELESTIAL OBJECTS

INTRODUCTION

Perhaps the most bizarre post-war phenomenon was the sudden barrage of reports, in the summer of 1947, describing unidentified objects in the sky. The incident which evidently triggered the volley was the now-famous account by Kenneth Arnold, in which he claimed to have seen "nine peculiar-looking aircraft" without tails, which flew in a chain-like line and "swerved in and out of the high mountain peaks." The handling of this incident by the press led to the unfortunate but descriptive term "flying saucer," which caught the public imagination. From that time on, there has been a fairly steady stream of similar reports, including some of "flying saucers" seen prior to the Arnold incident, which presumably otherwise would have gone unreported. (It is pertinent, therefore, to speculate whether any of the incidents would have been reported if Mr. Arnold had not made his observation.) Possibly, of course, we deal here with an excellent example of mass hysteria. In the interests of the defense of the country, however, it would be highly inadvisable to ignore the accounts, even though the chance be remote that they contain anything inimical to the nation's welfare. To this end, the present investigator, as an astronomer, was asked to review the data, to eliminate the patently astronomical incidents and to indicate which others might have such an explanation.

GENERAL PROCEDURE

The method of the investigation was to examine a number of individual reports of unidentified aerial and celestial objects, to determine which of them could be explained on purely astronomical lines -- that is, how many cases give evidence corresponding to descriptions of meteors, fireballs or bolides, comets, the planets, or even the sun or moon. Analysis was based entirely upon these reports, furnished by Project GRUDGE offices, with no attempt to make independent interrogation of witnesses, since this was not authorized under the contract. Nor was any attempt made to deduce explanations for the non-astronomical incidents, although hypotheses which appeared possible from the evidence were noted.

The subject reports number 244 and cover, approximately, the period from January, 1947, to January, 1949. They do not, however, correspond exactly to the number of separate incidents: sometimes, two or more reports refer to the same object observed by different people (although in general such cases have been handled by affixing letters to the incident numbers, thus: 33, 33a, 33b); occasionally, subdivisions of one number patently refer to separate phenomena. To avoid confusion, one report is being submitted by this investigator for each numbered incident, with cross references for identical or similar incidents, and separate discussions for those including more than one phenomenon.

Inasmuch as the avowed object of the investigation was

solely to indicate the possible astronomical content of the reports at hand, in the primary analysis all evidence was accepted at face value, with no attempt to evaluate psychological factors. Frequently, however, when fairly liberal limits of tolerance were allowed, the report made sense physically, whereas the literal statement did not. (Whenever allowance was made for possible errors arising from subjective reporting, the fact was noted.) Furthermore, while some of the reports verge on the ludicrous, the attitude deliberately adopted was to assume honesty and sincerity on the part of the reporter. Among the general public, two attitudes toward "flying saucers" seem to be prevalent: one, that all are obviously illusions, hallucinations, or hoaxes; the other, that "there must be something to it." From the outset, this investigator has attempted to regard each report, insofar as is logically possible, as an honest statement by the observer, and to adhere to neither of the two schools of thought.

One further comment should be made: almost all of the data dealt with in this investigation are extremely tenuous. Many of the observers' reports are incomplete and inexact, and some are distinctly contradictory. Therefore, it has obviously been impossible to reach definite, scientific conclusions. Most explanations are offered in terms of probability, the degree of which is discussed in the individual reports, but can be indicated only generally in the statistics which follow.

SUMMARY OF RESULTS

What, in particular, was gathered from the evidence concerning the astronomical character of the objects observed?

Of the 244 incidents submitted, 7 are excluded from all statistical reckoning: 1 is identified (in the subject report) as a hoax, 3 are duplicates, and 3 contain no information. In summarizing the findings in the remaining 237, two systems of classification are possible:

First, all incidents can be placed in one of two classes: 1) those which under no stretch of the imagination can be regarded as astronomical or extra-terrestrial (extra-terrestrial throughout this investigation refers solely to natural objects not originating on earth; it does not include "space ships from other planets"), and 2) those which either are definitely astronomical or can by suitable manipulation of the evidence be construed as such. The object here is to segregate all cases in which any vestige of astronomical origin is indicated. When this division is made, 111, or 47%, fall into the definitely non-astronomical category; or, conversely stated, 126, or 53%, might conceivably be considered (although the likelihood of their being so may be very small) as extra-terrestrial or astronomical in origin. The exact percentage is not important. The significant thing is that over 50% of the incidents might possibly be explained astronomically, if wide enough tolerances were allowed.

The primary purpose here, however, is to segregate incidents which have a reasonable degree of certainty of astronomical origin. Therefore, in a second, more detailed breakdown, incidents are placed in one of three classes, according to the most probable interpretation seen in the evidence offered (with a minimum of allowance for subjective observation). Class 1 includes the astronomical incidents (with degree of probability indicated). The non-astronomical incidents are divided into two classes, because it appeared as the work progressed that they fell naturally thus: in some, the evidence at hand suggested a simple explanation; in others, it did not. Listings under class 2 are not to be considered in any way decisive (with the exception of a few which, according to subject reports, have been definitely identified); they are offered as suggestions.

A summary of the results of this breakdown is shown in the table on the following page.

Class		Number of incidents	Approximate percentage
1. Astronomical			
a. High probability		42	18
b. Fair or low probability		33	14
	Total	75	32
2. Non-astronomical but suggestive of other explanations			
a. Balloons or ordinary aircraft		48	20
b. Rockets, flares, or falling bodies		23	10
c. Miscellaneous (reflections, auroral streamers, birds, etc.)		13	6
	Total	84	35
3. Non-astronomical, with no evident explanation			
a. Lack of evidence precludes explanation		30	13
b. Evidence offered suggests no explanation		48	20
		78	33

According to these findings, 78, or almost one-third, of the 237 incidents yet remain without an appropriate hypothesis for explanation. It is likely, of course, that with additional evidence a number of those included in class 3a would be easily explained (some of them, probably, astronomically). There are, however, at least 48 incidents in which the evidence, if correct as given, does not fit any simple explanation, and a number of these were reported by presumably well-qualified observers.

INCIDENT INDEX

1. Astronomical

   a. High probability:
   #26, 27, 30, 31, 32, 33, 34, 48, 49, 59, 60, 66, 69, 70, 94, 95, 96, 97, 98, 101, 102, 103, 104, 116, 119, 132, 136, 140, 147, 148, 158, 174, 184, 185, 187, 197, 203, 204, 208, 216, 219, 238.

   b. Fair or low probability:
   #19, 20, 23, 24, 28, 35, 36, 46, 50, 63, 67, 80, 82, 93, 100, 112, 120, 121, 129, 130, 144, 153, 165, 166, 167, 175, 192, 199, 202, 205, 220, 230, 240.

2. Non-astronomical but suggestive of other explanations

   a. Balloons or ordinary aircraft:
   #3, 11, 22, 41, 42, 53, 54, 73, 81, 83, 91, 92, 113, 114, 115, 126, 131, 138, 141, 145, 155, 156, 157, 159, 160, 161, 163, 169, 171, 173, 178, 180, 182, 188, 190, 194, 195, 196, 198, 200, 201, 209, 210, 217, 222, 235, 237, 239.

   b. Rockets, flares or falling bodies:
   #4, 5, 6, 7, 8, 9, 12, 13, 14, 15, 16, 25, 56, 65, 78, 106, 107, 108, 109, 133, 170, 211, 218.

   c. Miscellaneous (reflections, auroral streamers, birds, etc.):
   #39, 89, 123, 124, 128, 146, 164, 181, 189, 214, 221, 231, 234.

3. Non-astronomical, with no explanation evident

   a. Lack of evidence precludes explanation:
   #38, 44, 45, 47, 55, 57, 72, 86, 87, 88, 90, 99, 110, 117, 118, 125, 127, 137, 139, 149, 150, 177, 179, 191, 206, 212, 213, 229, 232, 233.

   b. Evidence offered suggests no explanation:
   #1, 2, 10, 17, 21, 29, 37, 40, 51, 52, 58, 61, 62, 64, 68, 71, 75, 76, 77, 79, 84, 105, 111, 122, 135, 151, 152, 154, 162, 168, 172, 176, 183, 186, 193, 207, 215, 223, 224, 225, 226, 227, 236, 241, 242, 243, 244, 134.

COLLATERAL STUDIES

In relation to the investigation, besides the individual analyses of separate incidents, two brief studies were conducted:

Certain breakdowns of the subject reports were made, for the purpose of determining whether they include any prevalent characteristics; for example, incidents were grouped according to the date of occurrence, the hour, the presence or lack of noise, presence or lack of trail or exhaust, number of observers, general qualifications of observers (whether with appropriate training for accurate observation of aerial phenomena -- aviators, weather observers, etc.; or laymen). Although these classifications were helpful in spotting identical or similar incidents, they revealed no pertinent trends.

As a matter of general interest, the highly dubious works of Charles Fort (which, as has been stated in a previous report, are entirely reprehensible in viewpoint, but which do contain accounts of unusual aerial sightings over a period of many years) were examined, to check whether any of the reasonably authenticated incidents are similar to these recent reports. It was found, however, that Mr. Fort's accounts do not include sufficient specific evidence to reveal positive similarities, and the most that can be said of the works is that they indicate that strange objects in the sky have been reported long before this post-World War II flurry.

RECOMMENDATIONS

This investigator would like to offer three recommendations, one in the general interest of the nation's airmen, and two as aids toward more effective investigation of the problem of unidentified aerial objects, if such work is continued:

First and foremost, it is definitely recommended that Air Forces personnel be apprised of simple astronomical phenomena like the recurrent brilliance of Venus and the characteristics of a typical fireball, so that much confusion and alarm and even possible tragic consequences can be avoided. If, as seems possible, Lieutenant Mantell met his death while attempting to chase down Venus, certainly the need for such basic education is great.

Second, if Project GRUDGE is authorized to extend its investigations, it might be found profitable to interrogate personally varied trained personnel concerning any untoward aerial objects which they may have observed in the past. Many competent observers might hesitate to take the initiative in reporting such phenomena for fear of ridicule or criticism, yet it is only from such people that accurate and meaningful descriptions can be obtained; reliance on the general public for such observations is almost certain to prove of little value. It would be of considerable aid to know whether (aside from the few cases reported here) experienced pilots, weather observers, and other "watchers of the sky" have ever found unidentified objects there. Even negative results would prove valuable, for they would offer evidence for the belief held by many that the unexplained

incidents do not really involve tangible physical objects.

Third, if this type of investigation is to be continued, men with proved scientific and technical ability should be assigned to carry out the interrogations and investigations; it would be preferable either that the interrogator and technical specialist be the same person or, at least, that they work together in close harmony. Such an arrangement would aid greatly in lessening the incompleteness and inexactness of evidence which has thus far hindered the explanation of many "flying saucer" incidents.

[redacted]
RESTRICTED

Incident #1, 1c, 1d, 1e -- Muroc, California -- 8 July 1947

No astronomical explanation for this incident is possible.

It is tempting to explain the objects as ordinary aircraft observed under unusual light conditions, but the evidence of the "tight circle" maneuvers, if maintained, is strongly contradictory. This incident must be judged with reference to other similar incidents, which probably have a common explanation.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #2, 2a -- Muroc, California -- 8 July 1947

No astronomical explanation is possible for this incident.

The object's slow speed and apparent size suggest aircraft under unusual light conditions, but the tactics argue against this interpretation.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #3 -- Maroc, California -- 7 July 1947

There is no astronomical explanation of this incident.

In this investigator's opinion, there is nothing in the evidence offered that is basically contradictory to the hypothesis of a weather balloon. Perhaps ascending currents of warm air over the desert could give the illusion that the object was oscillating.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #4 -- Rogers Dry Lake, California -- 8 July 1947

There is no astronomical explanation for this incident.

Is there any definite reason why the object observed could not have been a bursted weather balloon?

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #5 -- Portland, Oregon -- 4 July 1947

There is no astronomical explanation for this incident, nor for numerous others (#6, 7, 8, 9, 12, 13, 14, 15, 16) which occurred in and near Portland on the Fourth of July, 1947.

Besides being observed in the same vicinity, and most of them at the same time, the objects seen have in common a round shape, "terrific" speed, abrupt tactics, and quick disappearance. Abrupt tactics certainly suggest that the objects were of a very light weight.

This investigator can offer no definite hypothesis, but in passing would like to note that these incidents occurred on the Fourth of July, and that if relatively small pieces of aluminum foil had been dropped from a plane over that area, then any one object would become visible at a relatively short distance. Even moderate wind velocities could give the illusion that fluttering, gyrating discs had gone by at great velocities. Various observers would not, of course, in this case have seen the same objects.

The above is not to be regarded as a very likely explanation but only as a possibility: the occurrence of these incidents on July 4 may have been more than a coincidence. Some prankster might have tossed such objects out of an airplane as part of an Independence Day celebration.

If these were aircraft of either known or unknown type,

RESTRICTED

[redacted]

it would be difficult to explain their appearance over only one locality and at only one time, their apparent random motion, the lack of any sound or obvious propulsion method, and the lack of aerodynamic construction.

[redacted]

Incident #6 -- Milwaukee, Oregon -- 4 July 1947

There is no astronomical explanation for this incident.

See report on incident #5.

[redacted]

[redacted]

RESTRICTED

Incident #7 -- Portland, Oregon -- 4 July 1947

There is no astronomical explanation for this incident.

See report on incident #5.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #8,8a -- Portland, Oregon -- 4 July 1947

There is no astronomical explanation for this incident.

See report on incident #6.

RESTRICTED

[redacted]

Incident #9 -- Portland, Oregon -- 4 July 1947

There is no astronomical explanation for this incident.

See report on incident #8.

[redacted]

RESTRICTED

Incident #10 -- Boise, Idaho, 4 July 1947

There appears to be no astronomical explanation for this incident.

One minor lead is suggested: observation was made at the time of sunset, when light conditions are changing rapidly. Disappearance of the object might have occurred simply because of the changing visibility. It is the time of day when illusory effects are most likely to occur, and it might not be out of the question that the objects actually were other aircraft.

Despite these conjectures, no logical explanation for the incident seems possible at this time.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #11 -- Seattle, Washington -- 4 July 1947

There is no astronomical explanation for this incident.

The description answers that of a "hot air balloon," such as those launched at Fourth of July celebrations. There is nothing in the evidence given which is contradictory to this hypothesis.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #12 -- Vancouver, Washington -- 4 July 1947

There is no astronomical explanation for this incident.

See report on incident #5.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #13 -- Portland, Oregon -- 4 July 1947

There is no astronomical explanation for this incident.

See report on incident #5.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #14 -- Portland, Oregon -- 4 July 1947

There is no astronomical explanation for this incident.

See report on incident #5.

RESTRICTED

[redacted]

Incident #15 -- Portland, Oregon -- 4 July 1947

There is no astronomical explanation for this incident.

See report on incident #5.

[redacted]

RESTRICTED

Incident #16 -- Mt. Jefferson, Oregon -- 4 July 1947

There is no astronomical explanation for this incident.

See report on incident #5.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #17 -- Mt. Rainier, Washington -- 24 June 1947

There appears to be no astronomical explanation for this classic incident, which is the prototype of many of the later flying saucer stories.

It is impossible to explain this incident away as sheer nonsense, if any credence at all is given to Mr. Arnold's integrity. However, certain inconsistencies can be pointed out in the facts as reported:

Arnold's attention was first drawn to the objects by a bright flash on his plane, which was followed by numerous other similar flashes. If these were something like the flash one gets from a distant mirror, it means that the reflection was specular, or direct. For a direct reflection, the angle between the observer, sun, and object must be "just right," and at such distances as 20 or 25 miles, the chance of a series of direct reflections is extremely small. If the object was a diffuse reflector -- that is, scattering the sunlight falling on it, much as the moon or a balloon does -- then at such a distance it seems quite unlikely that Mr. Arnold would have been startled, or that our attention would have been called to it, unless the objects reflecting were extremely large.

The supersonic speeds called for if the estimated distance is correct also throw suspicion on the original calculations; by computation (see below) it can be seen that, considering the detail which Arnold observed in the objects, at least one of his estimates

[redacted]

RESTRICTED

must have been erroneous:

Arnold states that the objects seemed about 20 times as long as wide. Let us assume that the thickness was just discernible, which means that the object was just at the limit of resolution of the eye. Now, the eye cannot resolve objects that subtend an angle of appreciably less than 3 minutes of arc, and, in general, for any detail to be seen at all, the angle subtended must be much greater. Even if we assume the limiting resolution of 3 minutes, then, if the distance was 25 miles, elementary calculations show that such object must have been at least 100 feet thick, and if, as Arnold's drawings indicate, the object was some 20 times longer than wide, it must have been about 2000 feet long.

Looking at the matter in another way and assuming that Arnold's estimate of distance as 20 to 25 miles (120,000 feet) and his estimate of length as 45 to 50 feet are both correct, then it can be shown that the object will subtend an angle of only about 80 seconds of arc, which is definitely below the limit of resolution of the eye.

If Arnold actually saw the objects, and if his estimate of distance is correct, that of size cannot be, and vice versa. It seems most logical to assume that his estimate of distance is far too great. In fact, assuming a reasonable limiting size to the objects of 400 feet, in order to show the detail that Arnold's drawings indicate, the distance must have been not over roughly six miles. At this distance the objects would have travelled 11 miles (rather than 47 miles) in 102 seconds, or at a rate of approximately 400 MPH. (Arnold's

[redacted]

original estimate is also incorrect; if the objects had travelled 4" miles in 10½ seconds, they would have been travelling at a rate of approximately 1700 MPH, not 1200.)

In view of the above, it appears probable that whatever objects were observed were travelling at subsonic speeds and may, therefore have been some sort of known aircraft.

[redacted]

[redacted]

RESTRICTED

Incident #18 -- Toronto, Canada -- 20 September 1947

It is stated in the information given here that this incident has been determined to be a hoax.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #19 -- Dayton, Ohio -- 20 October 1947

Information given here is insufficient to exclude positively the possibility that the objects observed were a close pair of fireballs, but this seems extremely unlikely. Since the length of time in sight is not stated nor the speed estimated, it is impossible to draw any definite conclusions. Assuming these to be appropriate, if one were to stretch the description to its very limits and make allowances for the remarks of an untrained observer, he could say that the "cigar-like shape" might have been an illusion caused by rapid motion and that the bright sunlight might have made both the objects and the trails nearly invisible.

This investigator does not prefer that interpretation, and it should be resorted to only if all other possible explanations fail. In short, while it is not out of the realm of possibility that the objects seen were an unusual double fireball, it is most unlikely.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #20 -- Xenia, Ohio -- 20 October 1947

The information given here is insufficient to determine any possible astronomical origin of the object observed.

As in incident #19, while it is impossible to rule out the meteoric explanation (e.g., straight course, fast speed), the lack of information about trail, length of time in sight, manner of disappearance, and distance from observer, make any attempt at a definite interpretation rather futile.

Again, in short, it is not impossible that the object seen was a daylight, slow-moving bolide, but it is highly improbable, judging from the limited information offered.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #21 -- Des Moines, Iowa -- 29 June 1947

There is no obvious astronomical explanation for this incident.

If the estimate of size can be given any credence at all, the objects could not have been farther than five miles away; this is an absolute upper limit, and objects probably were very much closer.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #22 -- Spokane, Washington -- 21 June 1947

This incident does not have any obvious astronomical explanation.

The information given is too limited to suggest any definite interpretation. It would seem, however, that the objects might possibly have been a series of balloons.

RESTRICTED

[redacted]

Incident #23 -- Boise, Idaho -- 30 June 1947

It seems exceedingly probable that the object observed in this incident was a combination sun-cloud effect. The altitude of the sun was 30°, azimuth 280°. At that time of the afternoon, the sun's position was such that it could easily have illuminated a background cloud which was perhaps almost entirely covered by a foreground cloud. (Boise weather reports indicate an entirely clear sky, but the report of the incident itself states that the object "seemed to be clinging to a huge cloud.") This investigator himself has observed such effects.

[redacted]
RESTRICTED

Incident #24 -- Weiser, Idaho -- 12 June 1947

There is nothing in the description of this incident that is fatal to the hypothesis that the objects observed were parts of a "double fireball," but any such identification must remain uncertain.

The most convincing element favoring the meteoric hypothesis is the persistent train. Fireballs occasionally leave trains that persist for over an hour.

As far as trajectory is concerned, this is in agreement with that to be expected from a meteor on its way out from the sun (it having gone toward the sun several weeks previously and now being on its return journey toward outer space). Such a fireball would be travelling relatively slowly, and could appear to "shoot out from the sun" and to travel in a southeasterly direction.

The absence of bright flare and of noise is not unusual, since reported daylight meteors are frequently not luminous (but do leave a trail), and often no noise is heard.

Nor is the fact that there were two such objects fatal to the hypothesis. The object could easily have been single and have broken in two, either in its journey around the sun or upon entering the earth's atmosphere. There have been several cases of comets that were single on their trip toward the sun and double on the way out. Since comets and meteors are closely related as far as structure is concerned, the double feature is entirely possible.

- more -

[redacted]

The shooting up and down might be dismissed as subjective and illusory, although small bits shooting off from the main meteor could also give this effect.

In spite of all this, this investigator would prefer a terrestrial explanation for the incident.

[redacted]

RESTRICTED

Incident #25 -- West Trenton, New Jersey -- 4 July 1947

The object sighted here could easily have been a bright meteor, but in view of the date of the observation, it seems even more likely that the young lady saw part of a late Fourth of July celebration -- a rocket from some amusement park, perhaps.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #26 -- Harmon Field, Newfoundland -- 10 July 1947

The evidence presented here, and in incident #27, 27a, which refers to the same object, favors the hypothesis that the trail of a fireball was seen. The photographs submitted show a typical fireball trail. The "feathered edges" left on a cloud which the object broke through could easily have been caused by a fireball.

RESTRICTED

[redacted]

[redacted]

Incident #27, 27a -- Harmon Field, Newfoundland -- 10 July 1947

Evidence presented here favors the hypothesis that the trail of a fireball was seen by observers. For details see report on incident #26.

[redacted]

[redacted]
RESTRICTED

Incident #28 -- Idaho -- 24 June 1947

Any probable astronomical explanation for this incident is dependent upon the hour of observation, which is not stated in the information given with the summary.

An unconfirmed statement (by Mr. Markham, quoted in material submitted relative to incident #101) that the observation was made at 3:30 P. M. allows for no possible astronomical explanation other than that a persistent meteor train may have been observed. Such a phenomenon might have given the general impression suggested by the limited description of the incident.

If, however, the observation occurred during the early evening hours, shortly after sunset, which occurred that day at about 8:00 P. M. local time, then it is extremely likely that Lt. Gov. Whitehead saw either the planet Saturn or Mercury. Mercury set almost exactly an hour after the sun and was of stellar magnitude +1. Saturn, of magnitude +0.8 and hence about once again as bright as Mercury, set two hours after the sun. A bright planet shining through thin cirrus clouds could give the impression of a "comet-like object."

RESTRICTED
[redacted]

[redacted]
RESTRICTED

Incident #29 -- Portland, Oregon -- 14 June 1947

There is nothing whatever in this incident to suggest that the objects observed were of astronomical origin. Their maneuvers and the relatively long time they were in sight definitely preclude any possible astronomical interpretation.

It is of interest to note that in this locality and at this season other possibly-similar, non-astronomical incidents were reported -- e.g., #17 and #68.

RESTRICTED
[redacted]

[redacted]

[redacted]

Incident #30, a-c -- Lockbourne AAB, Columbus, Ohio -- 7 January 1948

Considering this incident with #32, 33, and 48, one is forced to conclude that the object observed from Lockbourne Army Air Base on the evening of 7 January 1948 was the planet Venus.

One report of the incident gives the location of the object as ESE-120°, or approximately opposite from that stated by other observers and that of Venus. Obviously, since the time of observation was the same, this means that one witness either was looking at a different object or had his directions mixed. Since the description otherwise agrees generally with the rest, and since it is assumed throughout the reports that all observers were viewing the same object, the latter interpretation seems preferable.

Witnesses state that the object "couldn't have been a star" (of course, it wasn't), because the sky was completely overcast. However, reports from the Columbus weather bureau indicate that, although the afternoon was cloudy, the sky was clear by 1900 hours. (This does not mean, of course, that there were no clouds near the western horizon.)

For possible explanations of the "tactics" reported by observers of this object, and further discussion of the incident, see report on #33.

[redacted]

[redacted]

[redacted]

RESTRICTED

Incident #31 -- northern Arizona -- mid-December 1946

The trail seen here was almost certainly that of a slow-moving fireball. In daylight quite frequently the primary thing observed in such cases is a white smoke trail.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #32 -- over Columbus, Ohio -- 7 January 1948

The evidence given in this incident fits the hypothesis that the object observed was the planet Venus, and, considered with incidents #30, 33, and 48, it is incredible that it could have been anything else.

See report on #33 for detailed discussion of sightings of 7 January 1948.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #33, a-g -- Godman Field, Fort Knox, Kentucky -- 7 January 1948
& discussion of all incidents reported for this date

Incidents #30, 32, 33, and 43 all occurred on 7 January 1948, with #33 involving the death of Lieutenant Mantell. Detailed attention has therefore been given to any possible astronomical body or phenomenon which might serve to identify the object or objects concerned. The four incidents are considered together here.

Although the several reports differ considerably in regard to the bearing and motion of the object (assuming for the moment that the afternoon and evening sightings refer to the same phenomenon), they are generally consistent concerning the time, manner, and place of its disappearance over the horizon. Hour and azimuth are given as 1906 CST, about 250°, by observers at Godman Field; 1955 EST, west southwest, by those at Lockbourne Air Base; and 1955-2000 EST, about 210°, by those at Clinton County Air Base; (there are, as is to be expected, slight differences in individual reports). Using this for the focal point of attack, one notes immediately that all these times and bearings agree closely with the time and place of the setting of Venus. Furthermore, all accounts except one agree that the object was low in the southwest before the time of disappearance. Reports vary as to details of its motion, but the overall motion was southwest and then over the horizon. These facts taken together preclude any question of coincidence. Furthermore, simultaneous observation from scattered locations proves that the object had negligible parallax, or, in short, that it was a very great distance away. All other statements concerning the object must,

[redacted]

RESTRICTED

it seems to this investigator, be weighed in terms of the overwhelming evidence of the manner of disappearance over the horizon.

The stellar magnitude of Venus on January 7 was -3.4, which makes it 29 times brighter than the bright star Arcturus. Venus, when as bright as this and shining through interstices in a host of clouds, could very easily give the effect of a flaming object with a tail. Concerning the erratic motion reported by some witnesses, this can be said: motion of clouds past the object could give the illusion of rapid movement, as when clouds scud by the moon; or the effect could have been a psychological illusion; a third possibility, remote but based on a rarely-observed phenomenon, is that, owing to thermo-inversions in the atmosphere, stars near the horizon have been known to jump about erratically through arcs of two or three times the moon's apparent diameter. Venus, when very close to the horizon, has been known to twinkle brilliantly with rapidly changing colors.

It appears to the present investigator, in summing up the evidence presented, that we are forced to the conclusion that the object observed in the early evening hours of January 7, 1948, at these widely separated localities, was the planet Venus. To assume that a terrestrial object could be located so high as to be visible simultaneously over a wide area, could be of such intrinsic brightness (of incredible brightness, far surpassing any known man-made light), and would be placed essentially at the very position of Venus in the sky over an

[redacted]

RESTRICTED

interval of more than half an hour, would be incredible.

Incident #33 is the only one of the four that includes the daytime observation of presumably this same object. The importance of the incident is, however, paramount, for it was in tracking down the mysterious object that Lieutenant Mantell lost his life. Again it is possible that the object observed was the planet Venus, although the evidence is by no means as definitive as that for the sightings made later that day. First, the bearings of the object as reported by various witnesses differ considerably; where one says southwest, another says south, for the same instant. However, integrating all the evidence, one is again struck with the coincidence of the object's position with that of Venus. The following short table of sightings vs the positon of Venus shows the general agreement of the two.in azimuth:

CST	Object	Venus
1330 (PFC Oliver)	SW of field	Almost due S: 174°
1345 (Sgt. Blackwell)	South of field	178°
(PFC Oliver)	SW	
after 1400 (Lt. Orner)	SW	from due S (180°) at 1400, moving westward
1445 (Capt. Mantell)	210°	195°
(Col. Hix)	215°	

A more pertinent question is that of whether it would have been possible to see Venus in the daytime on that day. All that can be said here is that it was not impossible to see the planet under those conditions. It is well known that when Venus is at its greatest brilliancy, it is possible to see it during the daytime when one knows exactly where to look, but on January 7, 1948, Venus was less than half

[redacted]

RESTRICTED

as bright as it is when most brilliant. However, under exceptionally good atmospheric conditions and with the eye shielded from the direct rays of the sun, Venus might be seen as an exceedingly tiny bright point of light. It can be shown that it was definitely brighter than the surrounding sky, for on the date in question Venus had a semi-diameter of 8 seconds of arc, or a total apparent surface area of approximately 125 square seconds. Assuming that a square second of sky would be a trifle brighter than the fourth magnitude, a portion of the sky of the same area presented by Venus would be about -1.4 magnitude. Since the planet, however, was -3.4, it was 6 times brighter than an equivalent area of sky. While it is thus physically possible to see Venus at such times, usually its pinpoint character and the large expanse of sky makes its casual detection very unlikely. If, however, a person happens to look toward a point on the sky that is just a few minutes of arc from the position of Venus, he is apt to be startled by this apparition and to wonder why he didn't see it before. The chances, of course, of looking at just the right spot are very few. Once done, however, it is usually fairly easy to relocate the object and to call the attention of others to it. However, atmospheric conditions must be exceptionally good. It is improbable, for example, that Venus would be seen under these circumstances in a large city.

It can be said, therefore, that a possible explanation for the object sighted in the daytime in incident #33, a-g, is that it

too was the planet Venus. In the absence of exact measures, however, it is impossible to establish that it was or was not. (It is unfortunate that theodolite measures of the afternoon observations were evidently not made.)

It has been unofficially reported that the object was a Navy cosmic ray balloon. If this can be established, it is to be preferred as an explanation. However, if one accepts the assumption that reports from various other locations in the state refer to the same object, any such device must have been a good many miles high -- 25 to 50 -- in order to have been seen clearly, almost simultaneously, from places 175 miles apart.

It is entirely possible, of course, that the first sightings were of some sort of balloon or aircraft, but that when these reports came to Godman Field, a careful scrutiny of the sky revealed Venus, and it could be that Lieutenant Mantell did actually give chase to the planet, even though whatever object had been the source of the excitement elsewhere had disappeared. At the altitudes that the pilot reached, Venus would have been very much more easily observed than from the ground, and it might even be that he did not actually pick it up until he was at a considerable altitude. The one piece of evidence that leads this investigator to believe that at the time of Lieutenant Mantell's death he was actually trying to reach Venus is

[redacted]

that the object appeared essentially stationary (or moving steadily away from him) and that he could not seem to gain on it.

In summing up, this can be said: the evening sightings reported in incidents #30, 32, 33, and 48 were undoubtedly of the planet Venus. Regarding the daylight sightings from Godman Field and other places in Kentucky, there seems so far to be no single explanation that does not rely greatly on coincidence. If all reports were of a single object, in the knowledge of this investigator no man-made object could have been large enough and far enough away for the approximately simultaneous sightings. It is most unlikely, however, that so many separate persons should at that time have chanced on Venus in the daylight sky. It seems, therefore, much more probable that more than one object was involved: the sightings might have included two or more balloons (or aircraft); or they might have included both Venus (in the fatal chase) and balloons. For reasons given above, the latter explanation seems more likely. Such a hypothesis does, however, still necessitate the inclusion of at least two objects other than Venus, and it certainly is coincidental that so many people would have chosen this one day to be confused (to the extent of reporting the matter) by normal airborne objects. There remains one possible, very plausible explanation for this fact, however: was the original report by any chance broadcast by local radio stations? If so, with the general public on the alert, even

[redacted]

[redacted]
RESTRICTED

the commonest aircraft might suddenly have appeared to be strange celestial objects.

In any event, since it seems possible that at the time of Lieutenant Mantell's death, he was actually giving chase to Venus (and since, certainly, during the evening sightings, persons assumedly well acquainted with objects of the sky were alarmed by the appearance of the planet), it might be wise to give information about this incident wide circulation among air force personnel, so that tragic mistakes will not occur in the future.

RESTRICTED
[redacted]

[redacted]

RESTRICTED

Incident #34, 34a-f -- Manitoba, Canada -- 13 October 1947

The reports of this incident answer to the description of a typical large meteor, or fireball. The trajectory, speed, color, and explosion are particularly convincing evidence.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #35 -- off coast of Oregon -- 12 November 1947

The information given here is too meager for a definite conclusion to be drawn concerning the identity of the objects observed. It is probable, however, that they were two parts of a meteor that had broken upon entrance into the earth's atmosphere. The length of time in sight is unduly great, but one wonders whether this might not have been grossly overestimated for psychological reasons. Otherwise, the scanty description favors the meteoric hypothesis.

RESTRICTED

[redacted]

[redacted]

Incident #3: -- Boise, Idaho -- Date unknown (probably November 1947)

Very little can be said of this incident, inasmuch as the date and exact time of observation, speed, altitude and size of object, and length of time in sight are not stated. The speed and time in sight are particularly important in forming a judgment. In the absence of this information, the most that can be said is that the object might have been a fireball.

[redacted]

[redacted]

RESTRICTED

Incident #3 -- Phoenix, Arizona -- 1- October 194

-here is clearly nothing astronomical about this incident,

and the information given here does not suggest any other explanation.

RESTRICTED

[redacted]

[redacted]

Incident #38 -- Hungary -- around [illegible] June 1947

It is extremely unlikely that the objects observed in Hungary were meteorites, unless the meager description given here is quite inaccurate. Without knowledge of the speed and trajectory of the objects, nothing definite can be said.

[redacted]

[redacted]

RESTRICTED

Incident #39 -- Grand Falls, Newfoundland -- 9 July 1947

It is extremely unlikely that these objects were meteors, although their speed would argue for such interpretation. Had they been, however, one would expect much more brilliant light, a trail, and perhaps even detonation. Furthermore, their flight in formation argues against their being meteoric.

The meager description suggests a light phenomenon rather than material objects. Was any auroral activity reported in the region at the time? The description answers more closely to a detached auroral streamer than to anything else, but this explanation is perhaps also far fetched.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #40 -- Phoenix, Arizona -- 7 July 1947

No astronomical explanation seems possible for the unusual object cited in this incident.

This case is especially important because of the photographic evidence and because of the similarity of these photographs to the drawings by Kenneth Arnold (incident #17). The two incidents are separated by slightly more than two weeks, and, of course, they occurred in different localities. It is, however, perhaps more than coincidence that these two best-attested, entirely independent cases should agree so closely concerning the shape of the object and its maneuverability.

The present investigator would like to suggest that this incident, #40, being one of the most crucial in the history of these objects, be reopened for investigation. The actual camera used by Mr. Rhodes should be examined, and the original negatives preserved. Since, from the size of the image on the photograph, we can have an accurate estimate of the angle subtended by the object, this, in connection with what appears to be a fairly reliable estimate of the distance, can give us an estimate of the forces and accelerations involved in the trajectory described by Mr. Rhodes. (It is unfortunate that a competent investigator was not dispatched at once to "reenact the crime" with Mr. Rhodes and to obtain sketches of the trajectory, etc., before details faded from his memory.) It would be important to know at what

RESTRICTED

[redacted]

altitude and azimuth Mr. Rhodes' camera was pointed at the time of his two exposures and the approximate time interval between exposures. Physical data like these are absolutely essential if we are to get anywhere in any basic physical explanation of these incidents.

There remains the strong possibility that the entire incident is spurious, and the invention of an excitable mind. This strengthens the need for reinvestigation; if spurious, this fact should be highlighted and even publicized, to quench enthusiasm for the irresponsible reporting of "saucers" and like objects.

[redacted]

RESTRICTED

Incident #41 -- Anchorage, Alaska -- 11 July 1947

No astronomical explanation can be given for this incident.

The object apparently was a balloon, altnough the meager data given does not allow a definite conclusion.

RESTRICTED

[redacted]

[redacted]

Incident #42 -- Anchorage, Alaska -- 12 July 1947

As in incident #41, no astronomical explanation can be given here.

In this incident also, the temptation is to assume that the object seen was a balloon.

[redacted]

[redacted]

RESTRICTED

Incident #43 -- Clarion, Iowa -- 29 June 1947

This incident refers to the same sighting by the same observer as that summarized in incident #21. See that report for conclusions.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #44 -- near Milwaukee, Wisconsin -- 28 June 1947

Information given here is insufficient to indicate what was seen. If this were a totally independent observation and not one that was presumably incited by current radio reports of flying saucers, more weight could be given to it. As it is, with flying saucer talk rampant, almost anything from meteors to balloons or aircraft would be reported as saucers by an uncritical observer. It is unlikely, however, that there was anything astronomical about this incident.

RESTRICTED

[redacted]

[redacted]

Incident #45 -- Illinois -- 28 June 1947

See statement concerning incident #44.

Information is entirely insufficent to determine whether anything of an astronomical nature was observed.

[redacted]

[redacted]

RESTRICTED

Incident #46 -- Greenfield, Massachusetts -- 22 June 1947

This incident does not admit of a ready astronomical explanation. The absence of a trail does not favor the meteoric hypothesis, although the speed and brilliance of the object might.

RESTRICTED

[redacted]

[redacted]

Incident #47 -- Fairfield-Suisun Air Base, California -- 6 July 1947

This incident cannot be readily explained astronomically. The object was in sight too long to be a meteor, and the variable "reflection" and absence of any statement about trail also argue against that interpretation. It is difficult, however, to rule out the hypothesis completely, because of the lack of pertinent information and the ever-present possibility that the reporting was more subjective than objective.

[redacted]

[redacted]

RESTRICTED

Incident #48 -- Clinton County Air Field, Ohio -- 7 January 1948

This incident must be considered with #30, 32, and 33. Combined evidence shows that the object observed from Clinton County Air Field on the evening of 7 January 1948 was undoubtedly the planet Venus.

For discussion of erratic motion related by the observers of the object, and other details, see report on incident #33.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #49 -- Danville, Kentucky -- 9 January 1948

Although the distance, time in sight, speed, sound, size, color, and construction of the object reported here are not stated, the fact that it showed a long trail and exploded makes it entirely probable that it was a fireball.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #50, 50a -- Wildwood, New Jersey -- 10 January 1948

In view of the unbalanced character of at least one of the observers (as indicated by the report of the interview), this investigator wonders how much credence can be given to the reports of the object or objects cited. For instance, the summary states that the first object was in sight 5-8 seconds, while the interview indicates 15-20 minutes. Assuming that this first incident was authentic and the shorter time correct (it evidently being the estimate given by the second observer), there is nothing in the evidence that is contradictory to the notion that the object observed was nothing more than a slow-moving fireball. The color, splitting into two pieces, and manner of disappearance all support this view.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #61 -- Oswego, Oregon -- 3 September 1947

The limited information given here does not suggest anything astronomical.

It is surprising that there was only one witness to this incident, since it occurred in a city, at a time when there was a plane in the sky.

If these objects were not ordinary aircraft at a great distance, or a cluster of balloons, then the incident must be considered together with others reporting groups of unidentified round or discoid objects, several of which occurred in this locality (e.g., incidents #6-9, 12-16).

RESTRICTED

[redacted]

[redacted]
RESTRICTED

Incident #52, a -- Hamilton Field, California -- 29 July 1947

The objects observed here were almost certainly not astronomical, although their speed, shape, and manner of disappearance might tend to the fireball hypothesis. The lack of trail and the "tactics" pursued by the second object make the likelihood of that interpretation very slight; however, the possibility cannot be entirely ruled out if considerable allowance is made for looseness in reporting.

RESTRICTED
[redacted]

[redacted]

RESTRICTED

Incident #53 -- near Lake Meade, Nevada -- 28 June 1947

There appears to be nothing astronomical about this incident.

According to the observer, the objects had a speed of 285 MPH and were moving on a course of 120°. Now, since the plane was moving at 285 MPH on a course of 300°, it is possible that the observed motion of the objects was only apparent (since 180° plus 120° equal 300°), and we can conjecture that a cluster of balloons (cosmic ray apparatus perhaps) was observed, the motion of which was merely a reflection of the motion of the plane.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #54 -- between Dutch coast & Norfolk, England -- 16 Jan. 1947

The object observed here was obviously not astronomical.

From the information given, it appears that this was definitely an aircraft.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #55 -- Harmon Field, Newfoundland -- 23 July 1947

If proper allowance is made for the reporting of untrained observers, it is possible that the objects observed in this incident were a minor meteor shower. The "reddish flashes of light" and "abrupt darts" would tend to this interpretation. The hypothesis hinges, however, on the statement that "a number of intermittent flashes were observed for three minutes." If this means independent flashes, it lends support to the meteoric interpretation. If it means that the same objects flashed intermittently for three minutes, that theory is ruled out. It seems more probable in view of the statement about "abrupt darts of light" that the former meaning is correct.

There is somewhat more evidence in this incident than in #57 (which is similar, and occurred just three days earlier) favoring meteors, but probably the events of these two incidents are related, and it is very unlikely that meteors could explain both of them.

According to the report of the U. S. Weather Bureau on ball lightning, it would appear that this phenomenon sometimes takes the form of luminous darts and can be red. Perhaps this could offer an alternate explanation for the incident.

RESTRICTED

[redacted]

[redacted]
RESTRICTED

Incident #56 -- Birmingham, Alabama -- 6 July 1947

This incident has no obvious astronomical explanation.

The photograph purported to be a part of the report of the incident is not documented. There is no proof in the evidence at hand that it shows the objects described. From the word description alone, which is quite limited, the objects could be explained simply as rockets: "vertical ascent," "travelled in arc." Data is too meager for a definite conclusion, however.

If the photograph is authentic, it would be extremely valuable to know the shutter speed at which it was taken, since from this the angular velocity could be determined.

RESTRICTED
[redacted]

[redacted]
RESTRICTED
SECRET

Incident #57 -- between Nova Scotia and Newfoundland -- 20 July 1947

This incident and #55, which occurred in the same vicinity just three days apart, do not fit into the usual description pattern. In both cases, information given is meager, and in both cases the meteoric hypothesis cannot be completely ruled out, but the objects could have been rockets or even freak auroral streamers or brush discharge from ionized dust clouds. In any event, it seems unlikely, although it is not impossible, that the objects seen in this incident were meteors. The even spacing of the flashes argues strongly against the meteoric hypothesis.

RESTRICTED
[redacted]

[redacted]

Incident #58 -- NW of Bethel, Alaska -- 4 August 1947

There is no astronomical explanation for this incident. The time in sight (four minutes) and rate of speed (520 MPH) seem to preclude any such possibilities.

The similarity of this incident to #10, in which several objects were seen silhouetted against a sunset, is striking.

[redacted]

[redacted]

RESTRICTED

Incident #59 -- beyond Necker Island -- 12 September 1947

From the evidence at hand, it appears quite likely that the object observed was a fireball. Fireballs have been known to change course abruptly when splitting. The reported change to reddish hue from the previous color of incandescent light, the length of time in sight, and the manner of disappearance all lend support to this hypothesis. At sunset one can expect relatively slow-moving, nearly horizontal fireballs.

RESTRICTED

[redacted]

[redacted]
RESTRICTED

Incident #60, a, b -- Cordroy, Newfoundland -- 10 July 1947

The descriptions given by the three observers of this object answer quite closely to that of a typical bright, "slow-moving" bolide. It is extremely likely that the object sighted here was nothing more than a fireball.

RESTRICTED
[redacted]

[redacted]

RESTRICTED

Incident #61, 61a -- Logan, Utah -- 8 September 1947

This incident, and incident #62, which clearly refer to the same objects (witnesses were together at the time of observation) do not have an astronomical explanation.

Since it was dark, any judgment of distance can be greatly misleading, and extremely fast motion might be ascribed to closeness rather than to true linear distance.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #62 -- Logan, Utah -- 8 September 1947

This incident does not have an astronomical explanation.

See report on incident #61.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #63 -- NE of Helena, Montana -- 29 July 1947

With the exception of the color ("like polished nickel") and the lack of statement concerning a trail, the object reported in this incident might very well have been a daylight meteor. Bright meteors have been observed to move in wavy paths. The manner of disappearance ("melted into thin air") further supports this view. Time in sight and speed also check. In short, it is more likely that this object was a bright meteor than that it was anything else.

RESTRICTED

[redacted]

[redacted]
RESTRICTED

Incident #64 -- Twin Falls, Idaho -- 19 August 1947

There is nothing astronomical in this incident.

The reported overcast sky could have made it possible for signal or search lights to be reflected from the cloud background.

RESTRICTED
[redacted]

[redacted]

RESTRICTED

Incident #[illegible] -- Rehoboth Beach, Delaware -- September 194[illegible]
October 194[illegible]
2 June 1947

This incident contains nothing astronomical.

It is entirely possible that the objects observed on these three separate dates were "Bumble Bees," ram-jet missiles, as fired from Fort Miles by the Applied Physics Laboratory of Johns Hopkins University. Since the hour of observation of the various sightings (and the exact day of the first two) is not given in material submitted to this investigator, positive identification cannot be made; but if these facts are known, inquiry at the above-mentioned laboratory (address: 8621 South Georgia Avenue, Silver Spring, Maryland) might bring forth definite identification.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #66 -- Silver Springs, Ohio -- 7 August 1947

From all evidence, it appears that the object seen here was a bright meteor. Slow-moving meteors occur before midnight, and, while their paths are almost never "absolutely horizontal," it is quite possible that the observer could have gained this impression, since the object was in sight for only three or four seconds. Furthermore, an observer, surprised by an unusual occurrence, often tends to overestimate the actual duration of time; thus, "three or four seconds" might mean not much more than a second.

There is nothing at all in the evidence that cannot be explained under the assumption that the object was a meteor.

RESTRICTED

[redacted]

[redacted]

Incident #67 -- near Placerville, California -- 14 August 1947

If details of the observers' statement are accurate, it would be difficult to assign an astronomical origin to the object seen in this incident. There are a few statements which, taken alone, strongly suggest that a meteor was observed: high rate of speed, "seemed to be in a shallow dive," white smoke trail, "disappeared in a puff of dark gray smoke." However, unless the description of the object (4-6 feet long and 10-14 inches wide) and the estimated distance (less than 1000 feet) are illusory, the meteoric explanation will not hold.

[redacted]

[redacted]

RESTRICTED

Incident #68 -- Portland, Oregon -- 24 June 1947

There is no astronomical explanation for this incident, which should be considered together with the Kenneth Arnold case (#17), which occurred on the same day, and in which similar discoid objects were observed. (The present objects appeared to have tails, however; another major difference between this and the Arnold incident is the inferred size of the objects, as determined from the estimated distance.)

It is difficult to take seriously the peculiar action of the compass, for this would imply fantastically large magnetic fields.

RESTRICTED

[redacted]

[redacted]
RESTRICTED

Incident #69, 69a -- Philadelphia, Pennsylvania -- 6 August 1947

The reports of this incident and those of #70 refer to the same object and are typical of descriptions of relatively slow moving meteors. The speed, trail, hissing sound (after passage -- although this could easily have been a subjective reaction), and color all check with the object's having been a fireball, bolide, or large meteor.

RESTRICTED
[redacted]

[redacted]

RESTRICTED

Incident #70, 70a -- Philadelphia, Pennsylvania -- 6 August 1947

The descriptions given of this object are typical of those of relatively slow moving meteors. See report on incident #69 for details.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #71 -- Las Vegas, Nevada -- 8 or 9 October 1947
(Supersedes interim report of 2/10/48)

In everything except the course flown, the description given here answers to that of a fireball. The course indicated in this incident, however, appears almost fatal to such a hypothesis. No fireball on record, to this investigator's knowledge, has been known to turn back on itself. Daytime fireballs have been observed, however, that were invisible save for a marked white cloudlike trail.

Most fireballs pursue essentially straight courses, and, in fact, apparent deviations are often caused by illusions of perspective and of a spherical sky. Real deviations are caused by effects of the meteor's encounter with the atmosphere. To execute a curved trajectory would require highly extraordinary circumstances indeed, and a meteoric explanation for this incident must be regarded as most improbable.

It is more likely that some sort of aircraft was under observation.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #72 -- Alaska -- 1947 (exact date not known)

From the scanty information available, it appears improbable that this object was astronomical, unless the report represents a highly garbled and subjective account of a daylight meteor. (The time of the sighting is not given, but it is assumed from the description of the incident that it occurred during daylight hours.)

It should be noted as a matter of general record that some of the reports received at observatories of recognized fireball falls are so highly colored and garbled that if the astronomer did not have independent evidence of the identity of the object, it would be impossible to determine from these reports.

RESTRICTED

[redacted]

[redacted]

Incident #73 -- Boston, Massachusetts -- 4 August 1947

There is nothing in the evidence given here to suggest that the object sighted was astronomical.

The description suggests rather that the object may have been a highly distorted reflection image of the sun on a balloon or aircraft. The "deep gold" color ascribed to the object tends to indicate this interpretation.

[redacted]

Incident #74 -- cancelled -- see #68

[redacted]

RESTRICTED

Incident #75 -- near Twin Falls, Idaho -- 13 August 1947

There is clearly nothing astronomical in this incident. Apparently it must be classed with the other bona fide disc sightings.

Two points stand out, however: the "sky blue" color, and the fact that the trees "spun around on top as if they were in a vaccuum." Could this, then, have been a rapidly travelling atmospheric eddy?

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #76 -- Salmon Dam, Idaho -- 13 August 1947

There does not appear to be anything astronomical about this incident.

Although sighted on the same day as the sky-blue canyon saucer (incident #75), the objects described here seem to have little or no similarity to the former.

[redacted]

[redacted]

RESTRICTED

Incident #77 -- South Brooksville, Maine -- 3 July 1947

There is nothing to suggest an astronomical origin of the objects cited in this unusually well-reported incident. Inasmuch as the sightings were made by an "astronomer" (although this investigator has never heard of him), one can presume that any astronomical implications would have been noted. The observer's question "Have any meteorites been reported?" is puzzling, because he should have been able to rule out that possibility himself. The estimated speed is all that would suggest meteors, and the absence of smoke trails and the general tenor of the description seems to rule out the objects' having been daylight meteors.

RESTRICTED

[redacted]

Incident #78 -- Grand Canyon, Arizona -- 30 June 1947

While it seems more probable that the objects sighted in this incident were freely-falling, man-made instruments, perhaps from bursted instrument balloons, the possibility of their being freely-falling meteorites is not completely ruled out. When the mass of an in-coming meteorite is of the proper order of magnitude, the meteor can come in on a non-vertical path, become a bright bolide, or fireball, and have its horizontal speed component reduced essentially to zero. It then falls to earth as a non-luminous, freely-falling body.

[redacted]
RESTRICTED

Incident #79 -- Richmond, Virginia -- April 1947

There is no astronomical explanation for this incident, which, however, deserves considerable attention, because of the experience of the observers and the fact that the observation was made through a theodolite and that comparison could be made with a pibal balloon. The observers had, therefore, a good estimate of altitude, of relative size, and of speed -- much more reliable than those given in most reports.

This investigator would like to recommend that these and other pibal observers be quizzed as to other possible, unreported sightings.

RESTRICTED
[redacted]

[redacted]

RESTRICTED

Incident #80 -- Arlington, Virginia -- 7 July 1947

There is nothing in the description of this incident that contradicts an explanation of the object as a slow-moving, bright meteor. Slow-moving meteors are generally observed before midnight.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #81 -- Hickam Field -- 7 July 1947

Clearly there is nothing astronomical in this incident.

It would appear that the object sighted was an instrument-carrying balloon.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #82 -- Oklahoma City, Oklahoma -- between 17-21 May 1947

At first glance it does not appear that this incident has an astronomical explanation, but there are several portions of the description that can fit into such a picture, particularly if allowance is made for subjective reporting. The speed and manner of flight tally with that to be expected from an early-evening bolide. The observer states that the object was "round but disclike" and then again says that it was ten times longer than thick. It appears to this investigator that this sort of impression could be given by a bolide, the persistence of vision accounting for the reported elongated appearance.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #83 -- between Boise & Meridian, Idaho -- 9 July 1947

There appears to be a time discrepancy in this incident: the summary report states that the object was in view 10 to 30 seconds, yet indicates that the observer had time to call a weather station to inquire about balloon releases, and also to expose 10 seconds of 8 mm. film.

In any event, however, besides the fact that no smoke trail was indicated, tactics of the object preclude the possibility of its having been astronomical; meteors do not execute "slow rolls" or climb upward.

A better estimate of speed is needed. The possibility remains that the object may have been an unsymmetrically-painted balloon.

RESTRICTED

[redacted]

[redacted]
RESTRICTED

Incident #84 -- near Lakeland, Florida -- 7 July 1947

There appears to be no astronomical explanation for this incident: upward trajectory and "plastic appearance," if accurately reported, do not lend themselves to such an explanation. No trail is mentioned.

RESTRICTED
[redacted]

[redacted]

Incident #85 -- cancelled -- see #29

[redacted]

[redacted]
RESTRICTED

Incident #86 -- Hollywood, California -- 6 July 1947

From the limited data available, there appears to be no astronomical explanation for this incident.

Rolling motion and saucer shape relate the incident to many others, which, however, did not exhibit the ray phenomenon.

RESTRICTED
[redacted]

Incident #87 -- Germany -- date not given

As this incident is reported, it is very unlikely that any astronomical interpretation can be offered. The description is probably of a low order of reliability, however, and it is not beyond reason that a spiral smoke trail ("first thought it was a cloud") from a meteor was observed. Unfortunately, no definite conclusion can be drawn.

[redacted]
RESTRICTED

Incident #88 -- Mackensack, New Jersey -- 3 August 1947

It seems clear that no astronomical interpretation can be given to this incident.

Information is so meager that little else can be said. If the object observed was only 200 yards away, it would seem that witnesses could have furnished much more detailed information.

RESTRICTED
[redacted]

[redacted]

RESTRICTED

Incident #89 -- 100 mi. W of Kansas City, Missouri -- 6 July 1947

There is no direct astronomical explanation for this incident.

The striking feature of the incident is that the "very bright" object travelled in the same direction and at the same speed as the observer did, and that it appeared at 11 o'clock position at his left, or approximately opposite to the position of the sun at the time.

It cannot be proved, of course, but it is probable that the witness saw a direct reflection of the sun on some continuous object -- thin clouds, ice crystals, or the like. (Had the object appeared on his right, then this explanation would be untenable.) Its disappearance can be explained logically also, for turning altered the observer's angular relationship to the reflector.

It is further noted that an apparent inconsistency exists in the report. The observer first stated that the object appeared to be the top of a water tank "low and to his left"; after checking his position he stated that the object was at 11,000 feet. The inconsistency in altitude throws some suspicion on the observation. If the object <u>was</u> low, then a running reflection along a river or railroad track would be a promising explanation.

RESTRICTED

[redacted]

Incident #90 -- between Las Cruces, New Mexico & White Sands V-2 firing grounds -- 29 June 1947

The information given here is insufficient for any definite conclusion to be drawn, but it is not impossible that the object observed was meteoric. The estimated time in sight is quite long, however, and, if a meteor, the object should have had a pronounced vapor trail. The "solar specular reflection which seemed to change in intensity" could, of course, have been light from the meteor itself, blended with daylight.

Once again, it is unfortunate that more detailed observations were not made.

[redacted]

Incident #91 -- Montgomery, Alabama -- 28 June 1947

No astronomical object could possibly behave in the manner described in this incident.

A small lighted balloon at the mercy of changeable winds aloft might offer a possible explanation.

(The stated position of the moon at the time has been checked and found to be correct.)

[redacted]

[redacted]

RESTRICTED

Incident #92 -- Manitou Springs, Colorado -- 19 May 1947

There is no astronomical explanation for this incident; the reversal of direction of flight and the maneuvers executed by the object preclude this.

The speed is not stated with any exactness, but if it was not too great, the object might have been a balloon, or aircraft seen under unusual conditions. Otherwise, there appears to be no plausible explanation.

RESTRICTED

[redacted]

[redacted]

Incident #93 -- Hartford, Connecticut -- 11 January 1948

Despite the absence of a trail and of sound, identification of this object as a fireball at the very end of its trajectory seems possible. It is described as "shooting toward earth at 45°," as resembling a "shooting star," and as having a very high velocity.

[redacted]

[redacted]

RESTRICTED

Incident #94 -- 42° 8.3' N, 114° 22.2' W -- 30 December 1947

This incident and incidents #95, 96, and 97, which describe the same object, clearly refer to a thoroughly authenticated fireball. These sightings can be dismissed with finality by the following quotation from Popular Astronomy, October, 1948:

Fireball of 1947 -- Dec. 30
Nancy A. Weber

> On this date at 7:30 P. M. PST a brilliant fireball appeared travelling westward over southern Oregon. ... Prof. J. Hugh Fruett gathered numerous reports from observers in Oregon, California, and Nevada, and from these made an appropriate solution for the path. He sent both his solution and all the 47 reports to the Flower Observatory where another solution was independently made. Ours agreed closely in all respects with that of Fruett except for the heights.
>
> . . .
>
> The meteor was most generally reported to be bluish-green in color. It appeared to explode twice, lighting up the countryside to close observers.
>
> The sound phenomena were limited to 6 out of the 47 observers.
>
> . . .
>
> From the height at which the meteor exploded it is doubtful whether any fragments reached the ground.

It is clear from the general agreement with this of evidence given in incidents #94-97 inclusive that this fireball was the object being described.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #95 -- Rosedale, California -- 30 December 1947

The description given here refers to an authenticated fireball. See report on incident #94 for details.

It is likely that the fire observed on the ground by viewers of this incident had no connection with the fireball, but it is not out of the question that a fragment of the bolide did land and cause a brush fire.

RESTRICTED

[redacted]

Incident #96 -- near Lovelock, Nevada -- 30 December 1947

The explosion seen in this incident was undoubtedly that of the fireball discussed in detail in the report on incident #94.

[redacted]

Incident #97 -- between Medford, Ore., and Mt. Shasta, Calif. -- 30 Dec. 1947

The flash or explosion referred to here agrees also in time and location (no other details are given) with that of the fireball described in detail in the report on incident #94.

[redacted]

[redacted]

RESTRICTED

Incident #98 -- Houston, Texas -- 2 November 1947

The information given here indicates strongly that the object observed was a fireball. There is nothing to suggest that it was not. As far as "falling into a nearby field" is concerned, that is perhaps the best-attested illusion with respect to these phenomena. Very frequently a fireball is reported to have fallen in a "nearby field" all along its track across two or three states.

RESTRICTED

[redacted]

[redacted]

Incident #99 -- Finland -- 3 January 1948

Information given here is insufficient to establish even vague identification.

The object seen could have been a fireball, although the length of time of observation seems unduly long. Perhaps this is subject to considerable error?

[redacted]

Incident #100 -- Finland -- 5 January 1948

Information given here is insufficient to establish any sort of identification. There is nothing in the county report of the incident, however, that could not be explained as a meteoric phenomenon.

[redacted]

RESTRICTED

Incident #101 -- Norcatur, Kansas -- 18 February 1948

This now-celebrated case of an unusual fireball has been adequately reported in astronomical literature; (for details, see Sky and Telescope, April, 1948, page 164, and October, 1948, page 293). Positive identification has been made by the recovery of fragments. The origin of this object is, therefore, definitely astronomical, and the incident need not be considered further.

RESTRICTED

[redacted]

[redacted]
RESTRICTED

Incident #102 -- air near Green River, Utah -- 18 February 1948

It seems entirely probable that the object observed in this incident and in #103 was the Norcatur meteorite seen at an earlier part of its trajectory.

The direction of flight is stated as "southeast of Limon, Colorado." If this means that the object was heading southeast from Limon, it could not have been the Norcatur fireball, since the direction of flight of that object was northeast; but if the statement merely means that the object was seen in the vicinity southeast of Limon, the location is consistent with the trajectory of that famous meteorite.

The time stated is approximate, and need not be given too much concern. Actually, of course, the sightings here would have had to be made almost simultaneously with those in Kansas. If the time had been reported as 1600 MST instead of 1500 (a typographical error, by any possibility?), then, allowing for the difference of one hour in time zones, the sightings would have been appropriately simultaneous.

In any event, whether this was the same or another object is not important. The description given -- particularly the statement "huge, multicolored ball of fire and dense cloud of smoke" -- answers closely to that of a fireball.

RESTRICTED
[redacted]

[redacted]
RESTRICTED

Incident #103 -- air near Green River, Utah -- 18 February 1948

It seems probable that the object observed here was the Moractur meteorite seen at an earlier part of its trajectory. See report on incident #102 for discussion.

RESTRICTED
[redacted]

[redacted]
RESTRICTED

Incident #104 -- Smyrna, Tennessee -- 7 March 1948

The object sighted here was undoubtedly the planet Venus. The stated position checks exactly (within allowable observational error) with the computed position of Venus. Description of color, speed, and setting time also all check closely.

RESTRICTED
[redacted]

Incident #105 -- Belmont, North Carolina -- 8 March 1948

The speed of 600 MPH, the lack of an exhaust trail, and the reported "exactly horizontal course" make it extremely improbable that the object seen in this incident was a meteor. The "steady reflection which did not flicker" also argues against that possibility. Since the observer was a technical man, it does not seem likely that his observations can be considered subjective enough to fit them into an astronomical hypothesis.

Incident #106-- Bakersfield, California -- 5 March 1948

While this report taken alone, with allowances made for subjective reporting, could be considered as applying to a disintegrating meteorite, the occurrence of at least three very similar incidents (see # 107, 108, 109) at the same location, over a time interval of a few days, is sufficient to make this hypothesis completely untenable.

The description applies more closely to the "star shell" (a projectile which after disintegration emits a parachute to bring instruments safely to the ground), with which this investigator was familiar during the war, than to anything else.

Incident #107 -- Bakersfield, California -- 8 March 1948

It is very unlikely that the objects observed here were of astronomical origin. See report on incident #106.

Incident #108-- Bakersfield, California -- 8 March 1948

It is extremely unlikely that this object was of astronomical origin. See report on incident #106.

Although the hour of observation is not stated in the witness's report of incident #107, it is possible, judging by the information which is given, that #107 and #108 refer to the same object or objects.

Incident #109 -- Bakersfield, California -- 9 March 1948

It is extremely unlikely that the object cited in this incident was of astronomical origin. See report on incident #106.

Incident #110 -- Baltimore, Maryland -- 23 March 1948

There appears to be nothing whatever astronomical about this incident, and, in view of the limited nature of the information given, nothing further can be said.

Incident #111 -- Philippine Islands -- 1 April 1948

There appears to be nothing astronomical in this incident.

At a distance of 3 miles an object 20 feet long would subtend an angle of slightly more than 4 minutes of arc, and hence would be very near to the limit of the resolution of the eye. The object must have been very much larger, if the distance is correct, for the observer to discern its shape and its turtle back.

Since the object was seen by only one person, and since the description is contradictory, it seems to this investigator that not much weight can be given to the incident.

Incident #112, a-f -- Ashley and Delaware, Ohio -- 8 April 1948
(Supercedes interim report of 2/15/49)

From the descriptions given by the various observers -- notably that the object seen appeared like a clearly-outlined cloud, was fleecy white, moved slowly and maintained shape, was a long vertical cylinder -- one can surmise that there is a strong possibility that the object was nothing more than a short, vertical, daytime meteor trail. These trails are known to persist for half an hour or more, and to drift with prevailing winds aloft. The fact that one observer stated that at first the cylinder resembled sky writing is excellent corroboration for the above explanation.

Incident #115 -- Montgomery, Alabama -- 9 April 1948

The object cited in this incident answers to the description of an instrument-carrying balloon. In any case, there is nothing whatever in the report which would allow for an astronomical interpretation.

Attention can be called to the similarity of the description given here to that of incident #81.

Incident #114 -- Fairbanks, Alaska -- 18 April 1948

There is nothing astronomical in this incident.

The description answers that of a maneuvering plane reflecting sunlight. One inconsistency is noted: report states, "Weather clear and visibility unrestricted," whereas weather sequence shows partial cloud coverage. This would not, of course, necessarily have prevented sun reflection from aircraft.

Incident #115 -- Greenville, South Carolina -- 19 April 1948

There is nothing astronomical in this incident.

The description suggests that the objects observed were balloons or aircraft reflecting sunlight.

[redacted]

RESTRICTED

Incident #116 -- Moose Factory, Canada -- 11 March 1948

This incident can certainly be ascribed to the fall of a bright meteor, or fireball.

RESTRICTED

[redacted]

Incident #117 -- Memphis, Tennessee -- 7 May 1948

It is unlikely that the objects viewed in this incident were meteors, but the possibility is not excluded.

It is unfortunate that some estimate of distance and of time in sight was not made. Objects might have been quite close, in which case large angular velocity would not imply great speed.

This investigator would like to emphasize again the need for better reporting of such incidents.

[redacted]

RESTRICTED

Incident #118 -- Berlin, Germany -- 28 March 1948

The information given here is insufficient for a definite conclusion to be reached; the only possible astronomical explanation, which would be a slow-moving meteor, is very unlikely.

RESTRICTED

[redacted]

Incident #119, 119a-b -- Asuncion, Paraguay -- 20 February 1948

While some of the reports of this incident are contradictory, the major portion support the hypothesis that the object observed was a slow-moving meteor or fireball. The speed and color concur in this. The fact that the object was seen over so wide an area implies that the observer who stated that it was only 1000 feet away was in error in his estimate.

[redacted]

Incident #120 -- Vejle, Denmark -- c. 7 February 1948

Nothing is said here that militates against the object's having been a meteor. Information is very scanty.

[redacted]

Incident #121 -- Cartersville, Georgia -- 9 January 1948

While the possibility of this object's being a meteor is not ruled out, it seems unlikely. Meteors are not known to be "light sky blue," nor to travel so slowly as indicated. However, report also states that color was an "intense blue," and, if speed were underestimated (or if object had a large radial velocity component -- coming largely "head-on"), it might possibly be interpreted as a fireball.

[redacted]

RESTRICTED

Incident #128, a, b -- Holloman Air Force Base -- 5 April 1948

At the moment there appears to be no logical explanation for this incident.

There is nothing to indicate an astronomical origin of the object observed.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #123 -- Alton, Illinois -- 11 April 1948

There is nothing of astronomical character in this incident.

If one considers Colonel Blagmund's statements apart from the considerably less reliable ones of other observers, it would seem that the object may really have been a bird.

RESTRICTED

[redacted]

Incident #124 -- North Atlantic -- 18 April 1948

On the basis of the information given about this radar sighting, no astronomical explanation of the incident is at all likely. Could the sighting possibly refer to a flock of migrating birds?

[redacted]

RESTRICTED

Incident #125 -- St. Louis, Missouri -- 2 May 1948

Information given here is inadequate to establish any category. The object observed was apparently nothing of an astronomical character.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #126 -- Anacostia, Naval Air Station -- 30 April 1948

There is nothing in the description of this incident to indicate astronomical origin of the object observed. It appears to have been a balloon.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #127 -- Yugoslav-Greek frontier -- 7 May 1948

Information given here is entirely too limited for any conclusions to be drawn. Possibly the object observed was a meteor.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #128 -- Hobson, Ohio -- 8 May 1948

Once again, the report given is entirely inadequate for a conclusion. However, astronomical origin of the object or objects observed seems very improbable.

The phenomenon described resembles the observation of an airplane beacon or search light reflecting against an overcast. This would certainly be periodic, appear phosphorescent, travel at great speed, and be oval in shape. Such interpretation would dismiss the occasional bursting and disintegrating as a subjective impression. -- However, weather conditions are not stated.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #129 -- Wilmington, North Carolina -- 31 May 1948

Evidence in this incident is contradictory, especially concerning tactics, but from the meager description and the fact that the object emitted smoke and travelled at a high speed, the possibility of its having been a meteor is not ruled out. Apparent oblong shape might have arisen from persistence of vision of a rapidly travelling bright object.

Is there a government testing field for guided missiles near by?

RESTRICTED

[redacted]

Incident #130 -- Plevna, Montana -- 17 May 1948

If the report is to be taken at face value, then no astronomical explanation of this incident is possible.

However, in seeking even a remote logical explanation for the incident, the present investigator is impressed with the fact that on this very night, May 17, Venus was at its greatest brilliancy, with a magnitude of -4.2, or about 100 times brighter than a first magnitude star. It would have appeared that night as an intensely bright light in the northwest.

Incident #131 -- Belleville, Illinois -- 20 June 1948

It appears improbable that this incident has an astronomical explanation. If the evidence is correct as given, the object could not have been a fireball. The zig zag course and the relatively slow speed do not fit in with the description of a large meteor. Lack of flare and train also tend to rule out this hypothesis.

The description answers that of a lighted balloon relatively close by.

Incident #132 -- Oslo, Norway -- 12 December 1947

The object observed here answers the description of a fireball, and the probability that it actually was one is very great.

Incident #133 -- Norway, Denmark, Sweden -- 26-28 February 1948

Information given here is too limited for any conclusions to be drawn. The stated heights, the occurrence at the same time each night, and their specific direction makes explanation of the objects as meteors unlikely. The green tails are also not characteristic of typical meteors, but would fit into a description of rockets or flares.

Incident #134, 134a -- Monroe, Michigan -- 28 May 1948

There is no direct astronomical explanation for this incident.

This investigator wishes to call attention to the fact that the objects observed were seen at essentially the same level as the lower cloud stratum and that there was a high overcast. Could it be that these officers saw successive shafts of sunlight, through breaks in the high overcast, illuminating small portions of the lower cloud stratum? Apparent speed of the objects could then have been a combination of the relative velocity of the C-47 and the projected motion of the break in the overcast.

Incident #135 -- Weaver, South Dakota -- between 15-20 August 1947

For the description of this incident as given, there is no astronomical explanation.

The statements of an apparently well-trained observer can scarcely be doubted, but no interpretation, either astronomical or otherwise, other than possible detached auroral streamers, suggests itself. The moon at the time was new and the night apparently very dark, the most favorable conditions for the observation of auroral phenomena.

[redacted]

RESTRICTED

Incident #136, 136a -- S. Knoxville, Tennessee -- 30 June 1948

This incident answers well to the description of a typical fireball: color -- orange; apparent construction -- fire; exhaust -- "streamer of bluish color trailing"; manner of disappearance -- "over horizon"; and (in remarks) "streamer emitted sparks."

All of the above fit the typical phenomena associated with a night-time fireball.

One witness states that the object was in sight for three minutes and the other states for three seconds. The lower time estimate is clearly more in keeping with meteoric phenomena. It is also probably far more nearly accurate, since one is much more likely to grossly overestimate than underestimate intervals of time.

RESTRICTED

[redacted]

[redacted]
RESTRICTED

Incident #137, 137a -- Chapel Hill, North Carolina -- 7 July 1948

This report refers solely to a sound phenomenon. Statements of the witnesses indicate specifically that no object was seen. The summary sheet given here seems to confuse the description of this incident with that of incident #138.

Fireballs and bright meteors are often known to emit sounds similar to the rolling of thunder. The information given in this report is so meager, however, that, while the sound referred to could have been meteoric, no decision can be made.

It seems more probable that actual aircraft were heard.

RESTRICTED
[redacted]

[redacted]

RESTRICTED

Incident #138 -- Columbus, Ohio -- 8 July 1948

There is clearly nothing of astronomical character in this incident.

It is the present investigator's opinion that the objects were aircraft. The"bobbing up and down" can be explained as a "seeing" effect -- that is, distortion of the image by air currents.

RESTRICTED

[redacted]

Incident #139 -- Osborn, Ohio -- 9 July 1948

There is no obvious astronomical explanation for this incident.

The present investigator was struck first by the fact that the description of the incident states, "... with about a quarter moon rising in the east-southeast." The quarter moon can never be seen in that position at 2147 hours (local time), for the quarter moon sets at approximately midnight. The moon at that date was not yet at the first quarter, and it set at Osborn at about 2300. The correct statement would be, "... with about a quarter moon setting in the west-northwest." This, oddly enough, is the quadrant of the sky in which the object was reported to be seen. In what direction, then, was the observer really looking?

Although the sky was reported as clear, could it possibly be that rapidly scudding clouds periodically obscured the setting moon -- a moon which, incidentally, does have a pale yellowish-white light?

Other possibilities that suggest themselves are detached auroral streamers or floodlights or searchlights playing on the sky.

Incident #140, a -- Gahanna, Ohio -- 1 July 1948

The object sighted here was probably a bright, slow-moving meteor. It is described as a "bright yellow-white light," moving at a "terrific" rate of speed, and was in sight for two or three seconds.

This investigator is again struck by the reference to the ubiquitous moon. "Bright moonlight" was reported; at the stated hour of observation, the moon had not yet risen.

[redacted]
RESTRICTED

Incident #141 -- Hecla, South Dakota -- 30 June 1948

The description given here obviously does not answer to that of a star, or of any other astronomical body.

In all probability the object was a cluster of balloons, carrying, perhaps, cosmic ray apparatus. This would account for the starlike appearance and the eventual breaking up into parts.

RESTRICTED
[redacted]

Incident #142 -- Boise, Idaho

No details are given concerning this incident. Letter from investigator indicates that observer was not sufficiently reliable to warrant consideration of his report.

[redacted]

RESTRICTED

Incident #143 -- Columbia, South Carolina

No details concerning this incident have been obtained.

RESTRICTED

[redacted]

Incident #144 -- near Montgomery, Alabama -- 24 July 1948
144a, b -- near Blackstone, Virginia -- 24 July 1948

The famous "space ship" sighting reported in incident #144 should be compared with #168 and 206, and also with #144a and b, which together constitute a separate incident if facts are correct as given.

For #144, there is no astronomical explanation if we accept the report at face value. The sheer improbability of the facts as stated, particularly in the absence of any known aircraft in the vicinity, makes it necessary to see whether any other explanation, even though far fetched, can be considered. The two reliable pilots obviously saw something. If one extracts from their reports parts of the description -- "tremendous bursts of flame," "cigar-shaped," "disappeared into a cloud," "orange-red flame," "time in sight five to ten seconds" -- one sees that this much, at least, could be satisfied by a brilliant, slow-moving meteor. The orange-red flame is particularly suggestive. It is pertinent also, that the only passenger awake at the time the two pilots sighted the object gave a description that does not tally with that of a "space ship" but does agree with that of a meteor.

It will have to be left to the psychologists to tell us whether the immediate trail of a bright meteor could produce the subjective impression of a ship with lighted windows. Considering only the Chiles-Whitted sighting, the hypothesis seems very improbable. However, not included in the summary but mentioned in the

voluminous collateral material is the report of a qualified Robins Air Base observer, who stated that he saw a cylindrical object trailing a red flash of fire, but did not discern any windows or a double deck; (admittedly, from the ground he would have had less opportunity to do so). The time of his observation is exactly one hour earlier, if both times are given in EST (as is stated). It is interesting to note, however, that Macon, Georgia, and Montgomery, Alabama, are both on the line of flight as described by the Montgomery observers.

If these two sightings refer to the same object, there are two possible interpretations: One is that the object was some type of aircraft, regardless of its bizarre nature. The distance between Macon and Montgomery is approximately 200 miles. From all reports the object was travelling definitely faster than 200 MPH, so would have covered the distance between the two points in much less time than that noted. (The schedule is, of course, correct for an ordinary aircraft.)

The other possible explanation is that the object was a fireball, in which case it would have covered the distance from Macon to Montgomery in a matter of a minute or two. If the Montgomery observers had been using daylight savings time (do regular

commercial airlines connecting cities using daylight savings time operate on it?), then there would be no discrepancy in the time.

The conclusion seems to be this: If the difference in time is real, the object was some form of aircraft travelling at 200 MPH. If there is no time difference, the object must have been an extraordinary meteor. The observation from two such widely separated points is the focal point of the investigation -- if one assumes that the same object was observed in the two cases. That there were two separate objects can most likely be ruled out by the sheer improbability of more than one such extraordinary object being seen on the same night, travelling over the same course, exactly one hour apart.

- more -

The object reported in incident #144a and 144b was very probably a meteor.

It should be noted that this object was travelling in the same direction as the one reported in #144, although separated by some 400 miles. It is not unusual for a fireball to be seen along a path several hundred miles long. There is a time discrepancy of 15 minutes between the observations, however; any connection between #144 and 144a-b (in considering the meteoric hypothesis) necessarily hinges on whether this time difference was real, or not.

[redacted]

RESTRICTED

Incident #148 -- Fielding Lake -- 9 July 1948

The lack of any exhaust trail and luminosity of eliminates an astronomical explanation for the objects reported here.

It seems more probable that they were distant aircraft flying in formation, or migrating birds.

RESTRICTED

[redacted]

[redacted]

Incident #146 -- San Acacia Dam, New Mexico -- 17 July 1948

Lack of exhaust trails eliminates any possible astronomical explanation for this incident.

It seems more probable that the objects observed were a) balloons at a much lesser distance than that estimated, b) aircraft in formation, or c) birds.

[redacted]

Incident #147 -- Springfield, Ohio -- 27 July 1948

The description of this incident, although meager, is in agreement with the hypothesis that the object observed was a fireball. Thus, "bright red tail of fire," "travelled in straight line," "great height," and the short time in sight all increase the probability that it was a bright meteor. The fact that it was travelling north, at this time of night, implies that the meteor was crossing the orbit of the earth on its way toward the sun when the collision occurred.

[redacted]

RESTRICTED

Incident #148 -- Springfield, Ohio -- 28 July 1948

The planet Venus seems to be the culprit in this incident. Venus attained its greatest brilliancy in the morning sky on July 31, and at approximately 0400 in the morning on July 28, it was a very brilliant object slightly to the north of east. The magnitude was -4.2, which makes it about 100 times brighter than a first magnitude star. Intermittent cloud coverage could easily explain the appearance and disappearance of the object, and as to the stated size, this can be dismissed as a purely subjective estimate. The evidence appears convincing to this investigator that the object observed was Venus.

RESTRICTED

[redacted]

Incident #149 -- North Jutland -- 19 January 1948

There is nothing in the meager description of this incident that precludes the possibility of the objects' being meteors. The description would also allow for their being rockets. However, the explosion of the objects favors the meteoric hypothesis.

It might be well to note the similarity of this and other Scandanavian reports to the "green flash" objects reported from New Mexico.

[redacted]

Incident #150 -- Swedish coast -- 1 March 1948

The description given here is entirely too fragmentary for any conclusions to be drawn. The object sighted could have been a meteor, a rocket, or a guided missile. The fact that it left no trail in the sky argues against its having been a meteor.

Note the similarity of this incident to #149 and #133.

[redacted]

[redacted]

Incident #151 -- Indianapolis, Indiana -- 29 July 1948

This incident and #152 are being considered together by this investigator, because they both occurred in Indianapolis, were separated by just two days, were observed at approximately the same time of day, and include certain similarities of description.

Both incidents are clearly non-astronomical.

Drawings are available for both objects observed, and, although they are considerably different, they might conceivably represent the same object viewed on edge and in plan. Both have approximately the same shape, although the scale given by one observer is about three times that given by the other. Both have 3:1 ratios of length to width. If these objects were real, it seems to be straining coincidence too far to assume that they were entirely independent of each other.

Were there by any chance some special glider experiments going on in the vicinity of Indianapolis at that time?

Barring hallucinations, these two incidents and incidents #17, 40, 75, and 84 seem to be the most tangible, from the standpoint of description, of all those reported, and the most difficult to explain away as sheer nonsense.

It should be noted that both incidents #151 and 152 had two observers.

[redacted]

[redacted]

RESTRICTED

Incident #152 -- Indianapolis, Indiana -- 31 July 1948

There is no astronomical explanation for the object observed in this incident.

See report on incident #151 for discussion.

RESTRICTED

[redacted]

[redacted]

Incident #153 -- Georgia -- 5 August 1948

The limited description which is offered here is consistent with that of a disintegrating fireball, in spite of the observer's statement that the object was not a meteor or falling star. Actually, fireballs bear little resemblance to the ordinary, frequently-seen meteors. The trail of sparks at the end is sometimes associated with a fireball.

[redacted]

[redacted]

RESTRICTED

Incident #154, 154a -- Columbus, Ohio -- 2 August 1948

This incident is in two respects unique among all those investigated: 1) it is the only object that is defined solely by an outline, appearing vacant inside, so that the sky was visible through it; and 2) it is similar to an object that this investigator viewed as a boy.

The writer's recollection has remained vivid throughout these many years. The object he saw could best be described as a floating ellipse, like a wire hoop travelling slowly across the sky. The motion was uniform, and the form of the object changed slowly, as though the hoop were being distorted. The object was observed for at least ten minutes, with several witnesses, until it finally disappeared in the distance. The writer had dismissed the object as some sort of unusual atmospheric phenomenon, perhaps a travelling air pocket.

Because of the similarity between this observation and that reported in incident #154, the latter has a special interest to this investigator. In the recent incident, however, the tail of smoke is an added feature.

There is obviously no astronomical explanation for these incidents -- the most plausible explanation probably lies in the field of meteorology.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #155 -- Columbus, Ohio -- 31 July 1948

There is no astronomical explanation for this incident.

If the information offered is to be given any weight at all, the most likely explanation is that a cluster of balloons, or a balloon with several fire-pots hanging below it, was observed. Corroboration for this interpretation is probably furnished by incidents #156 and 157, which occurred a few hours later near this location. The object reported in #157 proved to be a "county-fair" type balloon.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #156 -- Columbus, Ohio -- 31 July 1948

This incident and incident #157, which obviously refer to the same object, must be considered together. The object fell to earth and was retrieved; it proved to be a "county fair balloon," once quite common in this part of the country. Usually they are lighted in mid-afternoon, having one or more fire-pots to provide the hot air. They then rise and stay aloft for several hours before finally falling to earth.

It is highly probable that the object described in incident #155, which was observed a few hours earlier on the same day and near the same location, was this object, seen while it was still high in the sky.

RESTRICTED

[redacted]

[redacted]

Incident #157 -- Columbus, Ohio -- 31 July 1948

The object described in this incident can be easily identified as a "county fair balloon."

See report on incident #156 for discussion.

[redacted]

[redacted]

Incident #158 -- Groveport, Ohio -- 1 August 1948

With two essential items missing (speed with which the trail was formed and length of time involved in the formation), it is difficult to come to a definite conclusion concerning the origin of the object observed, but it is entirely possible that it was parts of the smoke trail of a fireball. Fireball trails have been known to act in the manner described. The witness states that the streak was not like an anti-aircraft shell burst or a vapor trail from a plane. He implies that the motion of the object forming the trail was very rapid, and that the distance was considerable. At least, nothing is said which is contrary to the meteoric hypothesis.

[redacted]

[redacted]

Incident #159 -- Worthington, Ohio -- 30 July 1948

No astronomical explanation is suggested by the description of this incident.

This investigator wonders whether an advertising "blimp" might not have been in the neighborhood. The time of observation was just after sunset, and a blimp would probably have given the appearance described.

It should be noted that the size of the object and distance are not stated.

[redacted]

[redacted]

Incident #160 -- Dravosburg, Pennsylvania -- 4 July 1948

There is no astronomical explanation for this incident.

The date of occurrence, July 4, suggests that the object seen might have been a part of some celebration -- for instance, a lighted balloon, or even a "county fair" type of balloon.

Or there may be a much simpler explanation for the incident: the observer was very close to the Allegheny County airport. Does the airport have record of either pilot balloon or small aircraft in the air at the time of the sighting? Since when the object seemed to stop it also changed direction, the stopping may have been merely the effect of perspective.

This incident does not appear to have any relation to incident #161.

[redacted]

[redacted]

RESTRICTED

Incident #161 -- McKeesport, Pennsylvania -- c. 8 July 1948

Information offered by these two untrained, uncritical, and excitable observers can be given little weight. There does not appear to be anything astronomical about this incident; chances are that the two women saw ordinary aircraft with sunlight reflected from fuselage but not from wings.

RESTRICTED

[redacted]

[redacted]

Incident #182 -- Hamel, Minnesota -- 11 August 1948

No astronomical explanation is possible for this incident. A meteorite would not have descended so gently, nor would it have risen again.

It seems incredible that this could have been an actual physical occurrence, but if it was, it is doubly unfortunate that no mature observers were at hand. If the object did land just a few feet away, one would think that even children would have given a more detailed description. Is it known whether the children have normal vision? To one with myopic vision, even a buzzard or hawk gliding to a landing might appear as a strange object.

[redacted]

[redacted]

Incident #163 -- VanNuys, California -- 21 July 1948

Since a complete description of this incident is given in numerous reports from Mt. Wilson Observatory and Griffith Planetarium, since the observations there were made with telescopes by experienced observers, and since their descriptions agree that the object was in all respects balloon-like, there is nothing that this investigator can add. The object was evidently an unidentified balloon.

[redacted]

[redacted]

RESTRICTED

Incident #164, a, b -- Uniontown, Pennsylvania -- 29 June 1948

There is no astronomical explanation for this incident.

Its occurrence at the time of a thunderstorm suggests that the report might be referred to an expert on ball lightning to see whether this might be a possible explanation.

Another possibility is that the observers saw a beacon searchlight projected against clouds, although if this were the case, it should have continued visible at regular intervals.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #165, a -- Chamblee, Georgia -- 26 July 1948

The object reported in incident #165 and 165a (which presumably refer to the same thing) can be easily explained as having been a very bright meteor. The majority of observers agree that the object did not maneuver, was on a steady course, and lost altitude slowly.

Numerous other reports (included with incident #144), from the vicinity of Augusta, which are widely divergent as to time, direction of motion, and color of the object, all appear to refer to a bright meteor. It may be that these scattered reports all describe the object of incident #165, a. It could be, of course, that the state of Georgia was treated to several fireballs in one evening, but it seems more likely that we have here an example of serious dispersion in the description of one object.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #166 -- Los Angeles, California -- 30 August 1948

The observer of this incident states that the object looked like a rocket and was larger than a B-29. He does not give the distance, but estimates the altitude as well over 20,000 feet. At this implied distance, it appears to this investigator that resemblance to a rocket must have been largely subjective.

Although a rocket cannot be ruled out, it is also possible that the object seen was a bright meteor. If the hour of observation given is correct, it was late twilight. It seems that a bright meteor appearing at this time could give the general impression of a rocket leaving a trail.

The report states that the object was observed through field glasses taken from a German 88 mm. artillery piece and that each lens was 8" in diameter. (This is an improbably large size for a field glass.) If the object completely filled the lens at that given altitude, either it was of a truly tremendous size or the glass was out of focus. Furthermore, the telegram and summary state that the object was travelling from west to east (another report says from north to south); if it had been a rocket heading east, the landing would probably have been reported.

All in all, the evidence supports the conclusion that the object was more likely a bright meteor than a huge rocket.

RESTRICTED

[redacted]

Incident #167 -- Pacific Ocean: 19° 08' N, 164° 05' E -- 6 May 1948

The object observed here was probably an exploding fire-ball seen head-on and seen only at the time of actual explosion. This, with partial cloud coverage, could easily explain the absence of a trail.

It is not likely that lights sighted on the water surface or aircraft sighted later had any relation to the original object.

If the object had been a shell fired from the USS Boxer, it appears improbable that only one shell would have been observed.

[redacted]

RESTRICTED

Incident #188 -- The Hague -- 20 July 1948

The information given here is too limited even for guesswork. It is extremely difficult to take at face value the report of an aircraft with two decks and no wings travelling with supersonic speed, even if "seen four times through clouds" by the chief of the Court of Damage and his daughter. It seems much more probable that the observers had a subjective impression of ordinary aircraft or a fireball. Even though these two items are at opposite ends of the scale, there is nothing in the evidence to favor one or the other.

In passing, it is interesting to note that this incident occurred just four days before the famous "Alabama space ship." Maybe our visitors from Mars were cruising around!

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #169 -- Maplewood, Ohio -- 29 August 1948

There does not appear to be any astronomical explanation for this incident.

There is some chance that the object could have been a weather balloon in the process of disintegration.

RESTRICTED

[redacted]

[redacted]

Incident #170 -- Adapazari, Turkey -- c. 5 May 1948

It is extremely unlikely that there is any astronomical explanation for this incident. The information given is very limited, but it points definitely to the probability that the object or objects sighted were rockets. The report indicates that one rocket-like object was recovered.

[redacted]

[redacted]

RESTRICTED

Incident #171 -- Moscow, Russia -- 3 August 1948

There is no astronomical explanation for this incident.

Perhaps the Russians were experimenting with their own or a captured German dirigible.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #172, a, b, c -- Fargo, North Dakota -- 1 October 1948

There is no conceivable astronomical explanation for this much-examined and much-discussed incident.

Analyses by a psychologist and a meteorological expert would be of importance here.

It seems significant to this investigator that other witnesses of the incident did not observe the complex tactics reported by Lieutenant Gorman, although they were presumably seeing the same thing. Is it possible, then, that the pilot "took on" a lighted weather balloon? (See report on incident #207 for further discussion.)

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #173 -- Shreveport, Iowa -- 18 September 1948

There is no astronomical explanation for this incident.

It appears probable that a balloon was under observation.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #174 -- near New Orleans, Louisiana -- 1 October 1948

There is a strong possibility that the object sighted here was nothing other than a fireball. The description of the object itself particularly suggests this: white hot, with red flames trailing. The course and size also fit in with the fireball hypothesis. It is an unusual time of day to see a slow-moving meteor, since in the early morning they strike nearly head-on; however, this one could have been seen after the earth's atmosphere had slowed it down very appreciably.

RESTRICTED

[redacted]

Incident #175 -- Santa Fe, New Mexico -- 23 September 1948

The evidence here is so contradictory that it is very difficult even to attempt any identification. For example, one observer states that the object was stationary; the other that it was moving at a speed of 700-800 MPH. One says the elevation was 45°; the other says 70°. It is hard to believe that they were looking at the same object, even though it is so stated.

Considering #175 (Mr. Angier's statement) alone, it is possible that the object observed was the planet Venus. The location is is given as southwest and the elevation as 70°, which correspond approximately with the position of Venus at the time. The magnitude of the planet was -3.8; it could have been visible in the daylight sky. It would have appeared, however, more like a pinpoint of bright light than like a "dime in the sky." It seems unlikely that it would have been noticed at all, but since the observer was looking closely at the sky ("watching a government plane come in"), he might have chanced upon it.

Considering the vast discrepancies in the two reports, it may not be amiss to suggest another, far fetched, interpretation for one or both. The moon at the time was in gibbous phase, and was a little off the horizon north of west. Most people are so unused to thinking of the moon in that position in the daytime that they fail

[redacted]

RESTRICTED

to identify it. This is particularly true if one's eyesight is not of the best. While this hypothesis has little correspondence to either report, as the evidence is stated, it is worth mentioning, especially since it may be met in future citings of incidents.

It seems far more probable that some type of balloon was the object in this case.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #176, a -- Castro's Ranch, California -- 23 September 1948

The two observers of this incident make, in several respects, directly contradictory statements: diffuse object versus definite box-shaped object, easterly line of flight versus northwesterly, etc. They agree on speed (very fast).

It does not seem likely that the incident can be explained astronomically. The only possible astronomical hypothesis would be that the object observed was the smoke mass from an exploded fireball, which would probably have an amoeba-like shape, agreeing with the description of one witness. At noon a meteor outward-bound from the region of the sun could approach the earth head-on, explode, and not leave any long trail.

However, in view of the conflicting descriptions, very little weight can be given to the whole incident. Perhaps the observers were looking at different things. There was a west-bound United Airlines plane in the vicinity at approximately that time; one observer may have seen that. The description of one observer suggests a box kite, such as those once used by weather observers.

RESTRICTED

[redacted]

[redacted]

RESTRICTED

Incident #177 -- Kentwood, Louisiana -- 5 September 1948

Contradictory opinions concerning the existence of the alleged unusual noise and the dubious personality of the reporter of this incident make serious attention to the incident impossible.

RESTRICTED

[redacted]

Incident #178 -- Honolulu, T. H. -- 18 October 1948

There does not appear to be any astronomical explanation for this incident. The moon had not yet risen at the time the object was sighted, although it was about to rise in the northeast.

The object may have been a balloon reflecting the light of the setting sun.

Incident #179 -- San Francisco, California -- October 1947

There is no astronomical explanation for this incident.

The extremely incoherent and unreliable naturo of the report of the incident makes serious consideration futile.

Incident #130a, b -- South Bend, Indiana -- 13 October 1948

There is no astronomical explanation for this incident.

Reflection of the sun from a balloon or aircraft appearing in foreshortened position might possibly account for the description given here.

Incident #181 -- near Dayton, Ohio -- 14 October 1948

There is no astronomical explanation for this incident.

Since the speed of the plane was 160 MPH, if it had passed through a cluster of small balloons, a flock of migrating birds, or any other group of relatively stationary objects, they would undoubtedly have appeared to observers within as objects whizzing by, much as telephone poles appear from a window of a speeding train. Little credence can be given to the pilot's statement that the objects could not have been migrating birds; there would have been no time for identification.

Incident #182 -- At sea: 74° 40' W, 36° 42' N -- 15 October 1948

The bearings and motion given in this report by the Master of the SS Gulfport do not correspond to those of any celestial object.

From the reported size and shape and the statement that the object had a bright center, one can surmise that it was spherical -- probably a balloon.

Incident #183 -- Japan -- 15 October 1948

There does not appear to be anything astronomical about this incident.

Radar experts should determine the reliability of the data, particularly concerning acceleration rates.

Incident #184 -- Winona, Minnesota -- 20 October 1948

This incident and #185 appear to be a clear-cut case of a fireball. Strongest evidence is the fact that the object was seen in several communities at the same time. While the reports given in the Minneapolis Morning Tribune article conflict in minor details, the general sense of the description of all observers fits that of a fireball.

Incident #185, a, b -- Minneapolis, Minnesota -- 20 October 1948

The object reported in this incident is the same as that in #184, seen from a different locality. The description of the incident leaves no question but that the object observed was a fireball.

Incident #186 -- near Sterling, Utah -- 16 October 1948

There is nothing astronomical in this incident.

It should be pointed out that, since the object was in sight just a few seconds, even a conventional aircraft under peculiar lighting conditions might have given the reported appearance. The estimated distance of 500 feet, if correct, should have allowed much more detailed observation. Probably the distance is grossly underestimated.

Incident #187 -- Godman Air Force Base, Kentucky -- 19 August 1948

There can be no question but that the object sighted in this incident was Venus. It was just three weeks past its period of greatest brilliancy, and was separating from the sun. The close agreement between the observed position of the object and the actual position of Venus, determined by others concerned with the incident and rechecked by this investigator, is convincing.

Incident #138 -- Goose Bay, Labrador -- 29 October 1948

There appears to be nothing astronomical in this incident.

Judging from the speed and apparent size of the object, it seems that a balloon may have been picked up by the radar.

Radar experts should evaluate these sightings.

Incident #189 -- Albany, Georgia -- 22 September 1948

There is nothing astronomical in this incident.

Since the object looked like a drone, perhaps it was one.

Incident #190, a, b -- Neubiberg AF Base, Germany -- 11 October 1948

The position of this object in the sky (northeast at an altitude of 70°) rules out any possible astronomical explanation. The moon had not yet risen at the time.

The description appears to fit that of a high-altitude balloon.

Question: If there had been "no release of airborne weather equipment prior to or during sighting," where did the information concerning winds aloft come from?

Incident #191 -- near Junction City, Kansas -- 24 October 1948

There is no astronomical explanation for this incident.

The description given is sketchy and would be entitled to no weight whatever if it had not been reported by a responsible USAF officer. With size, shape, time in sight, tactics, and sound not stated, it is impossible to say anything further than that this seems to be a typical example of the "garden variety" of flying saucer.

Incident #192 -- near Moorhead, Minnesota -- 24 October 1948

Despite the observer's statement that the object seen could not have been a meteor, the possibility is not ruled out. Early evening is the most propitious time for the observation of slow, bright meteors. This is the time of day when a meteor inbound to the sun and caught by the earth's gravitational field would appear to travel from east to west, and could appear to rise slightly. Most people identify meteors with sharp, fast flashes of light, which are not at all characteristic of slow fireballs. The observed turn is difficult but not impossible to explain; this investigator would prefer, however, to think that it was an illusion caused by perspective.

Incident #193 -- near Neudiberg, Germany -- 24 October 1948

It is very unlikely that this incident has any astronomical explanation. No trail nor luminescence was observed, and the object flew a straight and level course. Time in sight (two minutes) also effectively rules out any possible astronomical hypothesis.

Could the object reported here have been a conventional aircraft viewed in foreshortened aspect?

Incident #194 -- near Andrews Field -- 3 November 1948

No astronomical explanation is possible for this incident.

The object reported has been independently identified as an MIT cosmic ray balloon cluster.

Incident #195 -- Goose Bay, Labrador -- 31 October 1948

The object reported in this incident has no astronomical explanation: speed was too slow and time in sight too long.

The object, observed on a radarscope, was probably a balloon or unidentified aircraft.

Question: Is the speed indicated the radial velocity of the object or true space velocity? If the latter, it is obviously too slow for conventional aircraft.

Incident #196 -- Goose Bay, Labrador -- 1 November 1948

There is no astronomical explanation for this incident.

The object could have been balloon radiosonde..

Incident #197 -- Richmond, Indiana -- 5 November 1948

This incident very likely has an astronomical explanation; the object sighted was probably Venus. Venus rose on November 5 at about 3:30 A. M. and an hour later would have been a little south of east at an altitude of about 15°. Its magnitude was -3.4, or about six times brighter than the brightest star in the sky. The photograph taken of the object sighted does not contradict this hypothesis.

It is unlikely that the object observed was the bright comet (1948L) discovered one day earlier in the southern hemisphere, for this comet at that time was very far to the south and east, almost on the horizon, and was very much fainter than Venus. If the object seen here had been the comet, the persons observing it could lay claim to the first discovery. It was discovered one day later in Australia because of much more favorable location.

Venus, of course was visible all during the autumn of 1948 in approximately the same position as that in which it was seen on the morning of November 5.

It is also of interest to note that Mercury had its greatest western elongation on November 5, but it rose just at the beginning of the morning twilight and would therefore have been just rising at the time of this incident. Furthermore, Mercury was much less brilliant than Venus.

Incident #198 -- Wakkanai, Japan -- 6 November 1948

This incident has no astronomical explanation.

The object has been independently identified from radar information as a Soviet aircraft.

Incident #199 -- near Grays Harbor, Washington -- 30 October 1948

From the meager information given by Lieutenant Kunzman, presumably a responsible and well-trained observer, positive identification of the object is impossible, but it appears likely that it was a bursting fireball.

The bits of evidence that tend toward this interpretation are the following: one object bursting into ten or twenty pieces, color white and yellow, and the short time in sight. Manner of disappearance, simply fading from view "like fumes from an airplane," is also similar to that of a disintegrating fireball; in bright daylight the otherwise bright, flare-like quality is sometimes not observed.

Against this interpretation are the following: no lights or outstanding reflection, and no trail. The former might be the result of bright daylight: obviously the objects were observed, and if they were yellow and white, they must have had some luminosity. Lack of trail is, however, unusual.

Unfortunately, without more detailed information, little more can be said.

Incident #200, a, b, c -- Crescent City, California -- 17 October 1948

This incident has no astronomical explanation.

Although the four observers had no technical training, their reports are remarkably consistent. The object was in sight several minutes, too long to be a meteor; it made a banking turn of 45° and appeared to reflect sunlight very strongly. The speed was great but not excessive.

The object seen could have been an advertising blimp, a balloon, or an aircraft. The banking turn appears to rule out the balloon, unless this was a subjective impression caused by the turning of the balloon in the wind.

Incident #201, a, b -- Army Air Base, Azores -- 31 October 1948

There appears to be no astronomical explanation for this incident.

The observers agree in the general description, but not in the speed of the object: speeds are given from 30 to 800 MPH.

The most likely explanation on the basis of the meager information offered is that the object was a balloon carrying a swinging light.

Incident #202 -- Newark AF Base, New Jersey -- 8 November 1948

In everything but the luminosity, the object reported here answers to the description of a slow-moving fireball. Since it was in sight "one second or less," the first quarter moon and, presumably, the lights of the city and the airport, providing background and foreground illumination, may have tended to diminish the brilliance of the object. The time of day was most propitious for a slow-moving meteor. Unless a more likely explanation is forthcoming, this incident can be tentatively ascribed to the flight of a fireball.

Incident #203 -- Alberta Province, Canada -- 17 November 1948

The object reported in this incident was certainly a fireball. The description fits very closely.

Incident #204 -- Panama -- 8 November 1948

It seems entirely probable that the object sighted in this incident was the comet 1948L, which had been discovered two days earlier in Australia. The comet was suitably placed for observation near the equator and in the southern hemisphere. The time of observation also checks closely with the time of visibility. There is no single statement in the limited report that contradicts the comet hypothesis. If the observer had given the actual bearings of the object, those would have clinched the matter.

Incident #205 -- Carthage, Missouri -- 31 October (?) 1948

The vague nature of the information reported in this incident and the inferred unreliability of the observer makes it difficult to take the incident seriously, especially since the observer has obviously jumped to conclusions on the basis of insufficient evidence.

However, if credence is given to the observations, either they must be placed with the group of "aluminum-colored objects," or, if liberal allowance is made for subjective impressions, one could stretch a point to say that a slow-moving fireball was seen. This hypothesis is far fetched, but the speed of the object and the time of day favor it. The fact that the observer stated that the object was aluminum colored actually means little, since he immediately identified it as a flying saucer, which he knew from newspaper reports to be such a color.

It is very difficult to deal with reports of untrained and unreliable observers, because they invariably see in an incident what they wish to be there.

From a purely physical basis, this investigator would prefer the meteoric hypothesis, even though the evidence is entirely insufficient to establish it.

Incident #206 -- Clark AF Base, Philippine Islands -- 12 November 1948

Two things enter heavily into any possible interpretation of this incident: the reported maneuverability of the object, and the character evaluation of the witness.

If the facts are as stated, then there is no astronomical explanation for the object observed. A few points favor its having been a daylight meteor: the snow-white color, speed faster than that of a jet plane, roaring noise, similarity to "sky writing," and the time of day of the observation. The tactics, however, if really performed, oppose it strenuously.

The question is, did this object actually maneuver in and out of a cloud bank -- i.e., did it make turns of 180° or more? It is possible that such impressions were merely illusions. The witness saw the object intermittently through clouds. It is not clear whether he ever saw it against a cloud background or only in the sky background between clouds, a fact which is highly important. If he saw it only in breaks between clouds, this fact, coupled with its great speed, makes it clear that only momentary impressions could be obtained. Such observations, by an untrained observer, may bring forth a description that is extremely unlike the facts.

The impression of a fuselage with windows could even more easily have been a figment of the imagination.

Unless more specific information concerning this incident becomes available, the present investigator cannot say whether an astronomical explanation is possible, or not.

Incident #207, a, b, c -- Andrews AF Base, Camp Springs, Maryland---
18 November 1948

There is no astronomical explanation for the object observed in this incident.

The similarity of the incident to #172 is striking, and it suggests a common origin for the objects. The two incidents were separated by a month and a half and by half a continent. The hours of observation were about the same. It may be significant that ground observers in each incident did not report the evasive tactics described by air observers, and it is tempting to hazard the guess that such tactics were largely the result of relative motion. It should be investigated whether a lighted balloon caught in the prop wash could give the appearance of a rapidly-maneuvering aircraft. In fact, this investigator believes that it would be an interesting experiment to have a typical lighted balloon engaged by aircraft at night, with a competent observer along to record apparent relative tactics of the balloon.

(It is not clear whether the two observers in this incident who reported evasive tactics were in the same plane, or not, but it is presumed that they were.)

Incident #208 -- Clark AF Base, Philippine Islands -- 17 November 1948

The limited information in the description of this incident can be explained as referring to the trail and explosion smoke left by a fireball. The white exhaust trail extending some one to ten miles, the "flak-like" terminal burst, the estimated altitude, and the color and time in sight all concur in ascribing this sighting to a fireball. The time of day of the observation is also in agreement.

Incident #209 -- South Korea -- 4 November 1948

There is no astronomical explanation for this incident.

The object has been independently identified as a Soviet aircraft.

Incident #210 -- Boston, Massachusetts -- 10 November 1948

There is no astronomical explanation for this incident.

The objects seen were apparently conventional aircraft. It is rather surprising that, in the dim light, the observer could identify them as single-engine planes, and yet could hear no sound from them.

Incident #211 -- Bellefontaine, Ohio -- 4 December 1948

There is no astronomical explanation for this incident, in view of identification of recovered materials as man-made. Apparently there has been independent identification of the object as a pistol flare fired from the ground.

Incident #212 -- Dayton, Ohio -- 3 December 1948

Little can be determined from the scanty evidence concerning this incident. Two half-second pulses of light are apparently all that was seen. It is unlikely that any astronomical origin can be found for the object or objects observed, and certainly on the basis of so little information not even a guess can be hazarded.

See report on incident #213, which apparently refers to the same phenomenon.

Incident #213 -- Dayton, Ohio -- 3 December 1948

This incident may represent the same phenomenon indicated in #212. The description here is more detailed.

The object could not have been a meteor, since observers state that it was in view several minutes and that it was rapidly ascending, and disappeared overhead.

The moon was at crescent phase, and this investigator has often seen it at this phase appearing through small breaks in overcast, at which time it gave the appearance of a bright light flashing on and off. At the time of this incident, however, the moon was in the southwest, whereas the observers state that their object was in the northwest. The altitude given does agree approximately with that of the moon.

Incident #214 -- West Kindge, New Hampshire -- 7 July 1948

Inasmuch as the metallic particles concerned in this incident have been independently identified at MIT as parts of a cast-iron cylinder, an astronomical explanation of the incident is precluded. However, as a matter of general interest, it should be noted that iron meteorites could have produced the same effect. It is assumed, of course, that the MIT examination excluded the possibility of these particular particles being meteoritic.

Incident #215 -- Fairfield Suisun AFB, California -- 3 December 1948

If the observations were exactly as stated by witnesses, this "ball of light" could not have been a fireball. However, astronomers receive such outlandish reports about fireballs that they are prepared for almost any kind of a story.

Even trained observers are sometimes greatly fooled by the illusion of closeness; cases are on record of fireballs which were reported to have fallen in adjacent fields, but actually came to earth some 200 miles away.

A fireball would not come into view at 1000' and rise to 20,000'. If this observation is correct, an astronomical interpretation for the incident can be ruled out. Under unusual conditions a fireball might, however, appear to rise somewhat, as a result of perspective as it slants into the earth's atmosphere.

Absence of trail and sound definitely does not favor the meteoric hypothesis, but, as in many other cases, does not rule it out with finality.

It does not seem likely that any known meteorological or auroral phenomenon would have been as bright as this object was reported to be.

In the almost hopeless absence of any other natural explanation, one must consider the possibility of the object's having been a meteor, even though the description does not fit very well.

Incident #216 -- Chanute AF Base, Illinois -- 8 December 1948

A fairly bright, slow-moving bolide offers a good explanation for the object reported in this incident. The apparent rise can be explained as an effect of perspective. There is nothing in the description given that is contradictory to the bolide hypothesis.

Incident #217 -- near Pittsburgh, Pennsylvania -- 9 December 1948

There is no astronomical explanation for this incident.

The object seen could easily have been a balloon, for apparent speed could have been a result of the observers' own motion. Even if an object were standing still, observers in an airplane would not see it for much longer than the time reported here (7 minutes).

Incident #213 -- near Martinsburg, West Virginia -- 11 December 1948

As described, the object seen in this incident could have been a parachute flare. Under circumstances of a head-on approach, a meteor can appear stationary; however, the time in sight (one minute), if accurate, argues against the object's being a meteor. Therefore, while it is possible that the incident has an astronomical explanation, it is more probable that a flare was being observed.

Incident #219 -- Newburgh, New York -- 29 November 1948

The object reported in this incident is clearly a slow-moving fireball. Time of day, length of time in sight, and all other data check with the bolide hypothesis.

Incident #220 -- San Francisco, California -- 29 November 1948

There is good reason to believe that the object observed in this incident was a bolide. The fact that the observer, although a science teacher, confused the term comet with meteor is strong evidence that he is unaquainted with these phenomena: a comet appears stationary in the sky over a relatively long period of time. While the evidence is insufficient to establish with any certainty that the object was a bolide, it appears to this investigator, none the less, to be the most probable explanation.

Incident #221 -- Midland, Michigan -- 9 July 1947

From the chemical analysis (as reported in this incident) of the material turned in to the laboratory, it is evident that there is no astronomical explanation for the object. Meteorites do not include in their contents silver pellets or magnesium hydroxide.

This incident was evidently a prank or a private experiment. (Observer may or may not have been the instigator.) Since the event occurred on July 9, it is possible that chemicals left over from a Fourth of July celebration were used; the magnesium content might imply this.

Incident #222 -- Furstenfeldbruck, Germany -- 23 November 1948

The tactics described by this object, if correct, and the implied time in sight (long enough to call others to see it) argue strongly against an astronomical interpretation for the incident.

The object might have been a balloon with a light on it.

Incident #223, a-e -- New Mexico -- 5 December 1948

Since several separate sightings are encompassed by incident #223 to 223e, it must be regarded as a composite incident, occurring during one night but referring to several distinct phenomena. The reports in #223 appear in turn to be a part of a larger series of incidents, all concerned with the "green meteors" or "green flashes" which have appeared in and near New Mexico, and the present statement applies to some degree to all of them.

In his letter of December 29, 1948, to Lieutenant Colonel Rees of the OSI, my colleague Dr. Lincoln LaPaz has summarized thoroughly the nature of these incidents and, particularly, has noted the reasons why the objects concerned cannot be dismissed as ordinary meteoric phenomena. Dr. LaPaz is an extremely able man in the field of meteoritics and an enthusiastic, almost to the point of extravagance, investigator and worker. On the basis of the description at hand, I concur in his conclusions. Dr. LaPaz, who is "on location" and has observed at least one of these objects at first hand, should be fully supported in a continued investigation. Apart from the unusual appearance of the objects, the pattern of incidents is particularly striking. It would be exceedingly unlikely that so many meteors would appear in that small sector of the Southwest and nowhere else; if they did, they would not have consistently horizontal paths and

- more -

head in a consistent direction. These points alone are sufficient to dismiss the meteoric hypothesis. It is entirely possible that, among the many incidents reported, one or two of the objects may have been fireballs, thus serving to confuse the issue, but a blanket explanation of that sort is improbable.

I would suggest that Dr. Jack Workman, Director of the New Mexico School of Mines, be contacted. He is conducting highly classified experiments in very high velocity projectiles and may be in a position to offer a worthwhile opinion. High velocity experiments, probably in connection with preliminary trials in the production of artificial meteors or artificial satellites, may prove to be the explanation of these incidents. Such experiments would not be conducted at any of the recognized air bases so far contacted.

Note: It has come to my attention since the writing of the above that Dr. LaPaz, in the March issue of Popular Astronomy (LVII, 3, p. 136) refers to "the spectacular meteoric display of 1948 December 5" in northeastern New Mexico. It would seem an unusual coincidence that the sightings reported in this incident occurred on the same evening and yet were entirely apart from it. The apparent contradiction is puzzling.

Incident #224 -- near Las Vegas, New Mexico -- 8 December 1948

See report on incident #223 for detailed statement.

The present incident, if it were an isolated one, would be suggestive of a fireball, but, in view of significant differences and the general pattern of other related incidents, that explanation is improbable.

Incident #225 -- near Vaughn, New Mexico -- latter part of 1947
3 or 4 November 1948
23 November 1948

It is difficult to ascertain whether the objects described in this incident belong to the general group of "New Mexico green flashes," or not. The description here is sufficiently different from the majority to indicate that they do not: the characteristic green color is not mentioned.

It is improbable, however, that the three separate sightings, all occurring at approximately 2200 hours and in the same locality, can be explained as astronomical phenomena. Furthermore, the stated altitude and distance are entirely out of keeping; this fact might be discounted as an illusion, common in the observation of fireballs, if the instance were isolated. The weight of the evidence, however, inclines to the conclusion that the objects were man-made devices and part of some scientific experiments, so common in that section of the country.

Incident #226 -- Sandia Base, New Mexico -- 6 December 1948

See report on incident #223 for detailed statement.

Again, it is more probable that the object seen is related to the "New Mexico green flashes" than that it was a fireball.

Incident #227 -- near Hernal, New Mexico -- 12 December 1948

There is nothing that the present investigator can add to the detailed analysis given by the observer of this incident, Dr. Lincoln LaPaz.

See report on incident #223 for discussion.

Incident #228, 228a

No information (other than the names of observers) concerning this incident has been received by the present investigator.

Incident #229 -- South Bay, Florida -- 13 December 1948
229a -- Riviera Beach, Florida -- 14 December 1948

There seem to be two separate occurrences reported in this incident, and the information given for each is entirely insufficient for adequate analysis.

In #229, the location of the object in the sky is not given, nor is the hour of observation. The moon and Jupiter were visible in the early evening, the moon quite high, and Jupiter setting in the west. One might hazard a guess that Jupiter seen through a variable mist or high, thin cloud coverage appeared to blaze up and die out. The larger planets often become momentarily spectacular when they are very near the horizon and the weather conditions are right.

#229a occurred at dusk, with the observers looking out over the ocean. The nearly-full moon was fairly high in the southeastern sky at that time; there might possibly be some connection between it and the object observed, if weather conditions were unusual.

Incident #230 -- near North Powder, Oregon -- 4 August 1948

If it were not for the intense green color of this object, it would answer the description of a fireball. In view, however, of many similar occurrences in the New Mexico area, this interpretation is open to question. It should be noted that this incident occurred very much farther north than did the majority of the "green flashes," but that the observer was facing south. Nevertheless, considering the geographical difference, and the difference in season and in time of night of the observation, this object could very well have been a fireball. Insufficient evidence is offered to decide whether it belongs among the New Mexico objects or among the fireballs.

Incident #231 -- Abilene, Texas -- 1 January 1948

This incident has no astronomical explanation.

The fan-shaped glow that extended momentarily from the horizon to the zenith suggests a man-made disturbance -- electrical or explosive. The green color is the only characteristic that might connect this incident with the "New Mexico green flashes"; the rest of the description does not.

Incident #232 -- Demarest, New Jersey -- 16 November 1948

The information available concerning this incident is entirely insufficient to serve as a basis for analysis.

Incident #233 -- near Jackson, Mississippi -- 1 January 1949

There is nothing in this incident that can be said to have an astronomical origin.

The object sighted is described as resembling a tow target, but with no towing plane seen. No one else reported seeing the object after this one sighting by several persons.

Incident #234 -- Oak Ridge, Tennessee -- July 1947

Inasmuch as independent analysis has determined the object on the photographs to be a flaw, there is no need for further investigation. Object was never seen visually.

Incident #238 -- Indiana County, Pennsylvania -- probably early December 1948

There appears to be no astronomical explanation for this incident.

The object seen was most likely a balloon.

Incident #236 -- near Hickam Field, Hawaii -- 4 January 1949

There is clearly no astronomical explanation for this incident.

The account given seems trustworthy, even though only one person saw the circular disc. This report differs from many others in that the description of maneuvers executed by the object is definite, rather than hazy.

Incident #237 -- Bourbon County, Kentucky -- 16 January 1949

There is some confusion as to whether the object or the smoke trail reported in this incident was visible for fifteen minutes. If the object itself was, it could not have been a meteor, but the gist of the report seems to indicate that only the trail was visible for any length of time. In that case, it could have been either the trail from a meteor or the vapor trail from an aircraft: the description is not sufficient to distinguish the two. Other observers (not those reporting the incident) indicated that the object was a high flying plane with a vapor trail, but this does not necessarily exclude the meteoric hypothesis, because of the general unfamiliarity of the public with such phenomena.

Incident #238 -- Indian House Lake, Canada -- 18 January 1949

From the limited information given in the report of this incident, the object observed appears definitely to have been a fireball.

Incident #239 -- Phoenix, Arizona -- 24 October 1948

This incident as described is not amenable to any astronomical explanation. The object took 75 minutes to cross the sky.

The witness apparently is not a very critical observer (e.g., there could be no possible physical connection between the object's brightness and its apparent distance from a star).

The object could have been a lighted balloon; speed and maneuvers check.

Incident #240 -- near Hood River, Oregon -- 11 December 1948

The gist of this incident is that a flash of light was seen and a continuing sound of explosion heard at about 7:30 on a rainy evening. Clearly this description could apply to any large explosion, such as that of an ammunition dump or factory; however, it is true that when a bolide explodes a blinding flash of light is seen, and thundrous sounds are sometimes heard for many seconds. Since the sky was overcast at the time of this incident, and a light rain was falling, the earlier part of the trail of the fireball (if that is what it was) was, of course, not visible; only the flash from the final explosion, which would have appeared essentially stationary, was seen.

In the absence of positive evidence of any other type of explosion occurring in that vicinity at the time, it is the opinion of this investigator that a bolide explosion was observed.

Incident #241, a, b -- Los Alamos, New Mexico -- 20 December 1948

Dr. LaPaz, who has interviewed the various observers of this incident, has stated that the object seen was not a falling meteorite. He had access to more detailed information than is contained in the typed reports offered here, and he is an expert in these matters.

It should be noted, however, that the reports available to this investigator show many contradictions concerning the color and trajectory of the object: One observer gives the angle of fall as 45°; another states that the trajectory was horizontal. Most observers indicate a bluish-white light; only one mentions the color green, which is so predominant in the New Mexico "green flashes."

It is not at all certain that the object observed here belongs to the "green flash" family of incidents.

Incident #242 -- Los Alamos, New Mexico -- 6 January 1949

The information offered concerning this incident is meager, and there was only one observer. According to the description, a brilliant green incandescent light was seen low on the horizon for about two seconds; speed was "high" but slower than that of a meteor. In view of this scanty evidence, no definite conclusion can be drawn.

If it were not for the fact that the incident appears to belong in the family of New Mexico "green flashes," the object could be considered to have been a slow meteor, even though the time of night of the sighting does not favor that hypothesis. It is much more probable, however, that this incident falls into the pattern of those dealt with in detail in the report on incident #223. See that report for further discussion.

Incident #243 -- Los Alamos, New Mexico -- 28 December 1948

The object described here seems to belong to the mysterious family of "New Mexico green flashes." See report on incident #223 for detailed discussion.

It can be said, however, that, if this is regarded as an isolated incident, the description is not very different from that of a fireball. It is the occurrence of these incidents in a seemingly definite pattern that argues very strongly against the meteoric hypothesis.

Incident #244 -- Kirkland Field, Albuquerque, New Mexico -- 12 November 1948

The evidence given concerning this incident does not hang together physically: If the object was a bright white light, diamond-shaped and two feet long, and only a third of a mile away, then it seems incredible that it should have been observed over only a 500' trajectory. And a bright light, that close, in a populated spot, surely would have attracted the attention of more than one person.

The whole report suggests a physiological optical illusion rather than a real object in the sky. The evidence is incomplete: time in sight is not stated, nor is the elevation or bearing of the object even implied. The manner of disappearance is not told: did the light simply go out abruptly, or did it fade out gradually, or what?

There is a remote possibility that the observer saw a daylight meteor over a very short part of its trajectory, but if this had been the case, there should have been some sort of a trail.

The method of reporting and interrogation in this incident is very poor. It would seem that if the observer was aware enough to note a length of 2' and a trajectory of 500', he would also have known the bearing and elevation of the object and its manner of disappearance.

The whole incident lacks a sense of physical reality.

The preceding pages complete the analyses required to fulfill the terms of Contract No. W33-038-1118 (Ohio State University Research Foundation Project No. 364)

Note: In submitting this report it is understood that all provisions of the contract between The Foundation and the Cooperator and pertaining to publicity of subject matter will be rigidly observed.

Investigator J. Allen Hynek Date May 1, 1949

Laboratory Supervisor George H. Harding Date May 1-1949

For the Ohio State University Research Foundation

Executive Director James L. Owens Date 5/9/49

W.K.H.

Ohio State University Research Foundation, Mapping, Charting and Reconnaissance Research Lab., Columbus

Report on Unidentified Aerial and Celestial Objects - Appendix B - Final Report - Project 364 xUnidentified Flying Objects

Hynek, J. Allen 30 April'49 269pp.

USAF Contr. No. W33-038-1118

Phenomena, Aerial
Project "Grudge"

Military Operations (24) 18
Intelligence (4) 2