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Authority ND 971337

By VH NARA Date 2/14/98

No. 206: If description is accurate, i.e., wings on fuselage, roar of engine, circling object, possibility of weather balloon is remote. Also, latest time of release for Clark Field was four hours prior to sighting. Also, note F.B.I. note on character of observer.

No. 207: Definitely not a weather balloon.

No. 208: Object sighted about four hours after last scheduled release time. Upper air flow pattern gives no indication of possibility of weather balloon drifting in from another station. Also balloon would have to have leaked to remain at 30,000 feet.

No. 209: Determined to have been twin-engined bomber.

No. 210: Summary sheet missing; no altitude given; time incompatible with scheduled balloon release times. If direction is correct, objects were flying into the wind. Cannot be determined conclusively. Inclined to believe objects were Jet aircraft.

No. 211: Very Pistol.

No. 212: Object sighted three hours after release time of Indianapolis and Ft. Wayne balloons. Defective balloon could have remained low enough to be seen and upper winds indicate that such a balloon would have been in the Dayton area at the time sighted. All other statements of observers seem to indicate that the object was a weather balloon.

No. 213: Evidently refers to the same object as in Incident No. 212, but with entirely different description which, if accurate, makes conclusion on No. 212 obviously incorrect. If not same object, certainly not a weather balloon, as definite pattern of motion, as described, not possible under existing wind flow conditions.

No. 214: No information whatsoever.

No. 215: Very high winds 60-70 M.P.H. from SW at all levels, definitely would have prohibited any balloon from making any southerly motion. Also, last scheduled released time was three hours prior to sighting at 1,000 feet. No time in sight given so cannot compute rate of climb to 20,000 feet. Fairly conclusive, not a balloon of any kind.

No. 216: Object reported moving directly into 70 M.P.H. head winds at an estimated 350 M.P.H. Observer is a professional weather observer and should know a weather balloon. Also, reported sighting was four hours after scheduled release time.

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No. 217: Object reported moving into winds of 20-30K velocity and going faster than C-47 doing 180 M.P.H. The speed and direction are apparently very accurate since the C-47 was paralleling the object's course and several readings were made of the compass and air speed indicator. If report is true, definitely no balloon.

No. 218: No date given, consequently no check could be made of surface or upper-air data. As stated by observer, a flare is probable answer.

No. 219: Time of sighting coincides within a few minutes of the release time of the USAF rawinsonde at Newburgh and a pilot balloon sounding at New York. Very little description given that can be interpreted as either being a burning balloon or a meteor. One negative remark was that the object moved from East to West, an impossible situation for a balloon since winds at all levels were westerly.

No. 220: Wind at all levels W. to WNW; object reported flying directly into these winds. Also made definite turn from flying due North to North Northwest. Sighting time $4 \frac{1}{4}$ hours after scheduled release times at Alameda, Sacramento and McClellan AFB.

No. 221: No information.

No. 222: Winds aloft charts not available on this one. Object sighted $2 \frac{1}{2}$ hours after scheduled release time at which time it was plotted by a radar DF station to be at 27,000. A short time later the same station reported the object circling at 40,000; speed estimated at between 200-500 M.P.H. Most likely not a balloon.

No. 223: Definitely not a scheduled release balloon since it was seen to rise from the ground one hour before release time at Albuquerque and was seen by various persons as late as four hours after its original sighting. Seventeen individuals saw and reported this object as definitely a green flare. All commercial and governmental airfields were questioned concerning balloon releases with no success.

No. 224: Described exactly as that in No. 223, only at an altitude of 13,500 feet Mean Sea Level, 7,000 feet above the earth. Seen $2 \frac{1}{2}$ hours after scheduled balloon release time. Wind at levels from 10,000 to 15,000 was WNW while flare was reported as travelling at very high speed in a WSW direction. Very accurate observation made by two F.S.I. agents. Definitely not a weather balloon.

No. 225: No date given. Object sighted within 15 minutes of release time of pilot balloon soundings at Albuquerque at low altitude, 500 feet. Exploded in red spray at 200 feet. This exact phenomena occurred on three different occasions at the same time which would seem to eliminate possibility of burning weather balloon.

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No. 226: Sighted one hour after release at Albuquerque; same green flare appearance as in previous five or six cases, and moving into the wind from East to West. No balloon.

No. 227: Read report of incident; definitely not a weather balloon. Serves also as guide to interpreting Incidents 223, 224, 225, and 226.

No. 228: Case under investigation, no information.

No. 229: Case dropped.

No. 230: Exactly as described in 223, etc. Definitely no weather balloon.

No. 231: Another glowing green flare just as described above.

No. 232: Investigation dropped.

No. 233: Definitely no balloon; made turns, definite fuselage, accelerated from 200 M.P.H. to 400 M.P.H.

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By VH NARA Date 2/14/98

C O N F I D E N T I A L

Engineering Division
Memorandum Report No. MCREXD-694-18D
28 April 1949

References Cited

Carmichael, L., Hogen, H. P. and Walter, H. H. An experimental study of the effect of language on the reproduction of visually perceived form. Journal of Experimental Psychology, 1932, 15, 73-86.

Gilford, J. P. Autokinesis and the streaming phenomena. American Journal of Psychology, 1929, 40, 401-417.

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APPENDIX E

U. S. Department of Commerce Weather Bureau

Information on Ball Lightning

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Authority NND 971337

By VH NARA Date 2/14/88

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COPY

UNITED STATES DEPARTMENT OF COMMERCE
WEATHER BUREAU
Washington 25

In Reply Please Address
CHIEF OF BUREAU
and Refer to
O-4.3

Dec. 16, 1948

Commanding General
Air Materiel Command
Attention: MCIAXO
Wright-Patterson Air Force Base
Dayton, Ohio

Dear Sir:

Your letter of October 20, 1948, addressed to the National Bureau of Standards and requesting information on the subject of "Ball Lightning" has been referred to this Bureau for reply.

Attached is a tabulation filling in as well as practicable the information called for by the outline presented in your letter. We shall be glad to be of further assistance in connection with this matter.

Very truly yours,

/s/
F. W. Reichelderfer
F. W. Reichelderfer
Chief of Bureau

Attachment

COPY

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YUNITED STATES DEPARTMENT OF COMMERCE
WEATHER BUREAUReportInformation on "Ball Lightning"

I. Origin

Various theories and suggestions have been proposed to explain ball lightning, most of them being without well-established physical foundation. There is still doubt in scientific circles regarding the origin of a number of reported cases of ball lightning.

Briefly, the explanations of the origin of ball lightning may be broken down as follows:

(1) Brush discharge (St. Elmo's fire).

(May be stationary over sharp-pointed objects, or moving along or near the surface of wires, roofs, rocks, etc., especially on mountains. Conditions most favorable for brush discharge occur during thunderstorms, but the phenomenon may occur even during clear, dry, dusty weather. When a lightning stroke is approaching an object, the brush discharge becomes especially intense.)

(2) Intensely ionized, incandescent volume of air forming end of lightning stroke and lasting for short interval of time.

(This would occur mainly during thunderstorms following the passage of a lightning stroke. At the ground end, the terminal flash is intense, and vapors, smoke or molten material from objects fused at points struck may enhance and extend the duration of incandescence. After-image formed on the retinas of the eyes of a person looking at the brilliant flash at the point of discharge may give spurious effects.)

(3) Brush discharge in air containing high concentration of dust or other aerosols, during thunderstorms.

(If this occurs, it probably is associated with the path taken by a real lightning stroke, and presumably involves corona discharges from suspended particles and possibly combustion in some cases.)

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- (4) Jumping of gap by lightning indoors.
(When lightning strikes a house, lightning streamers may jump gaps such as between pipes within the house, thus causing a bright flash of limited extent. After-image is generally formed on the retina and movements of eye produce apparent movements of the illuminated region.)
- (5) A cloud-to-ground lightning stroke with an associate, horizontally-directed, moving potential wave may possibly produce a transient horizontal potential gradient sufficiently intense to initiate electrical discharges.
(Such discharges would involve luminous darts moving at high speed and may move over irregular trajectories, producing, in some cases at least, more-or-less horizontally directed, sinuous, ribbon-like or tubular paths. If there is a heavy concentration of electrical charges near the earth beneath the thunderstorm the triggering of a discharge by the transient potential gradient may yield horizontal lightning streamers having a relatively slow propagation rate and long duration.)
- (6) A lightning discharge that strikes and runs along a conductor such as power or telephone lines and flashes-over or jumps the gaps at breaks produces a brilliant illumination at the gaps that may be mistaken for ball lightning.
- (7) A piece of wire with attached light object that is carried aloft by the gusty winds and turbulence attending a thunderstorm or tornado may serve to facilitate conduction of lightning currents and yield streamers at its ends during discharges.
- (8) Spurious cases.
- (a) After-image (persistence of vision)
 - (b) Will-o'-the Wisp
 - (c) Meteorites
 - (d) Reflections of lightning observed on highly polished objects, such as door knobs.
 - (e) Falling molten metal
 - (f) Lightning channel seen on end.

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II. Appearance

(a) Forms

Spherical, roughly globular, egg-shaped, or pear-shaped; many times with projecting streamers; or flame-like irregular "masses of light." Appearance of outer boundary is generally hazy or ill-defined. Photographs of the phenomenon may show one or several sinuous, tubular propagation paths (trajectories taken by luminous darts), which may have associated with them broader luminous spaces of irregular configuration. (These latter spaces probably are regions where the sinuosities of path became involved and tortuous or are areas of major discharge where darts originated or terminated). Some paths show a beaded structure (alternate luminous and dark spaces).

(b) Color

Luminous in appearance, described in individual cases by different colors but mostly reported as deep red and often as glaring white. One scientist described the color in a certain case as similar to that he has noted in the laboratory on observing active nitrogen, or possibly slightly darker. Another observed one of yellow and still another of lavender or rose color. Others have reported some of blue appearance. The luminous mass is occasionally stated to be surrounded by a border, weakly but differently-colored than the main body.

(c) Degrees of Brilliance

Brilliance at most glaring white and incandescent. Minimum brilliance equal to that of feeble St. Elmo's Fire.

(d) Movement through Space1. Possible directions.

Generally downward, inclined or horizontal, in straight, curved, or tortuous paths. Mostly observed near the surface, but may originate in thunderclouds, and so take a trajectory from cloud to earth.

2. Maneuverability

May appear stationary, or moving. Range of speed is zero to values of the order of 10^7 cm./sec. In the

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latter, extreme case, the luminous darts observed are probably of the same general nature as the lightning streamer, although the path taken may be very irregular and even show reversals in direction. In some cases, long sections of paths of such luminous darts may show slight curvature. Near the ground or in closed spaces a much smaller speed is often said to be observed, mostly about 1 - 2 meters/sec. The "ball of fire" may seem to move or float along in a room, or to roll along the floor. In a thunderstorm, as may be experienced on a mountain top, an observer has reported "seeing balls of fire roll along the rocks and drop from one to another." Intense St. Elmo's Fire on sharp objects beneath thunderstorms may fluctuate rapidly in size, intensity, and orientation, or show displacements from one point to another, hence the flame may appear to whirl and dance, or move. When a lightning flashover at a point produces an after-image on the observer's retina, movements of the eyes cause corresponding movements of the image which the untrained observer attributes to the movement of a luminous "ball of fire" or flame. Ball lightning observed by Jensen¹ in the wake of a lightning flash through dust-laden air during a thunderstorm "appeared as a shapeless mass of lavender color which seemed to float slowly downward." Jensen states: "The rose-colored mass seemed most brilliant near the ground and gave the impression of a gigantic pyrotechnic display. Two or three of the globular structures seemed to roll along a pair of 2300 volt power lines for 100 feet or more, then bounded down on the ground and disappeared with a loud report."

When a lightning streamer from a thundercloud terminates in the air, the leader stroke is sometimes so faintly luminous in portions that only a segment of the path is observed. This may conceivably give the impression of elongated "ball lightning," but is a natural cloud-air lightning stroke.

3. Nearby Air or other Craft

There have been numerous cases of aircraft struck by lightning. When the aircraft is all-metallic, it serves as a Faraday cage, and provides electrical protection

1. Jensen, J. C. Physics, vol. 4, p. 372 (1933).

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to the crew and passengers. Just preceding the onset of a lightning stroke to an aircraft, pilots have reported observing a streamer of corona discharge build up on the nose, propellers or other extremity of the craft¹. The movement of the streamer accompanies that of the aircraft and depends on the passage of a lightning stroke nearby or through the aircraft. Corona discharges on sharply convex surfaces of aircraft have also been observed during flight between masses of clouds strongly charged with electrical charges of opposite sign (positive and negative). Autogenous charging of the aircraft by tribo-electric and other effects during flight through snow or other precipitation particles intensifies the corona discharges. These are of the same nature as St. Elmo's Fire.

St. Elmo's Fire has been observed numerous times on the mastheads of ships and generally moves with them during passage beneath thunderclouds or other meteorological conditions where intense electrical potential gradients exist.

(e) Effect on Surrounding Atmosphere

1. Clouds

Lightning of any kind can occur in clouds only if the dielectric properties of the air are broken down when the sparking potential gradient is reached. In clear air this amounts to about 30,000 volts per cm. at sea level and about 21,000 volts per cm. at 10,000 ft. altitude. In clouds, or in the presence of precipitation particles the sparking potential gradient is less, depending on the size of the particles. For example, in the presence of raindrops 1/8 inch in diameter it is about 10,000 volts/cm.

As shown by Macky², droplets of water suspended in an electrical field sufficiently intense to induce breakdown will display sparking-over phenomena and will

1. Harrison, L. P., "Lightning Discharges to Aircraft and Associated Meteorological Conditions," N.A.C.A. Technical Note 1001, (1946).
2. Macky, W. A., Proc. Roy. Soc. London, Ser. A, vol. 133, pp. 565-587, (1931).

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become deformed. Under very strong fields, the droplets become drawn out into filaments and disrupt with attendant electrical discharges along their surfaces or through them.

It is probable that these phenomena occur along the channel of a lightning stroke through a cloud, and that some evaporation and disruptive breakdown of droplets occur in consequence of the intense heat and flow of electrical charges. These major effects on cloud or precipitation particles are believed to be confined to the lightning channel, although minor effects such as glow or brush discharges from particles in other portions of the cloud possibly occur in connection with the development of lightning strokes. These discharges from countless particles may yield a general illumination within the cloud under strong electrical field conditions, especially during propagation of lightning strokes.

Effects of "ball lightning" on clouds are unknown. Since "ball lightning," if real, is presumably less severe than an ordinary lightning stroke or at most is probably a dart streamer of such a stroke, we may assume that the effects of "ball lightning" on clouds are not more severe than those outlined above in connection with lightning.

2. Increased Ionization

The formation of corona discharge at any point leads to a considerable increase in ionization of the surrounding air. Any case of so-called "ball lightning" which is actually a corona discharge will have a similar effect.

Ordinary lightning strokes distribute heavy concentrations of electrons and ions or charged nuclei along and near their channels during the passage of the stepped leader or dart leader. These particles form a space charge surrounding the channel. After the leader reaches the earth, the return stroke occurs from earth to cloud. When this develops, the space charge tends to migrate rapidly to the channel, producing a rush of charges within it. The flow of these charges in the channel yields the brilliant, return lightning stroke. Within the channel ionization is exceeding heavy.

"Ball lightning" associated with a true lightning stroke will probably involve a flow of space charges to its

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channel and so leads to a diminution of space charge from the environment of the path but an immediate increase of ionization along its path. Following the passage of the phenomenon, ionization will decay by recombination.

3. Nearby Air or Other Craft

All metallic aircraft which are struck by true lightning generally have scorch marks, pits, or holes burned through the skin. The holes rarely exceed one inch in diameter. (See N.A.C.A. Technical Note 1001). Portions of non-metallic material in contact with the area struck may be burnt or explosively separated from the metal to which the material is attached. When radio antennae are struck or the lightning arrester does not function as desired, damage to radio equipment often occurs.

Temporary blinding of pilots looking directly at the flash due to the stroke to some exterior portion of the aircraft such as the nose of the fuselage may introduce some hazard. As a rule the temporary blinding is effective from about 10 seconds to a larger fraction of a minute, but in one extreme case a copilot was reported to have been temporarily blinded for about 3 minutes. Several cases of temporary blinding of about 3 minutes have been reported.

The Weather Bureau has not received any reports of accidents in which an airplane was said to have suffered contact with "ball lightning." Judging by the phenomenon called by that name and experienced at the surface, the aircraft damage to be expected by such contact would probably be less severe than that caused by a typical genuine lightning stroke. That type of so-called "ball lightning" which is actually an intense corona discharge would not cause any mechanical damage to non-inflammable exposed materials, but would hamper radio communications by producing static similar to the kind termed "precipitation static."

A real lightning stroke to a non-metallic object on the ground often causes an explosive disruptive effect on the object and will cause burning of inflammable materials.

Contact of so-called "ball lightning" may have physical effects on exposed persons varying from negligible to

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fatal. In the cases of fatalities resulting from this cause, it is believed that genuine lightning was involved. Physical effects of electrical origin on persons enclosed in all-metallic aircraft are negligible, owing to the Faraday cage protection afforded by the conducting skin. However, a slight electrical shock may be experienced by a crew member aboard an aircraft if he is making good contact at two well separated points during passage of the steep wavefront of potential through the area of contact at the time of a real lightning stroke.

(f) Accompanying Phenomena

1. Sound

The origination and dissipation of "ball lightning" at the surface are often attended by a sharp report, but not invariably. Very frequently the beginning or end, respectively, of "ball lightning" is accompanied by a positively identified stroke of streak lightning to or very nearly to the point of observation. The thunder produced by such a stroke will naturally be considered by many observers to have been associated with the "ball lightning." "Ball lightning" which is in the form of a corona discharge makes very little sound, since the current carried is very low and the explosive heating effects on the air negligible. Lightning of the continuing-current type, with low-wavefront, will not produce intense sounds, and this is to be more or less expected, also, of isolated luminous dart streamers traversing the channels of preceding or succeeding lightning strokes. Such streamers have been included in the category of "ball lightning."

2. Chemical Effects

The odor of ozone in connection with "ball lightning" has been reported by some observers. This is to be expected in cases where the phenomenon is a brush discharge which produces ozone in air. When actual streak lightning is involved, the formation of oxides of nitrogen and ozone is a normal occurrence.

3. Thermal Effects

Fires have been caused in combustible material, such as straw, by discharges reported to have been "ball lightning."

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4. Electrical Effects

"Ball lightning" will certainly be accompanied by radio static in some form. Electrical shock to persons is possible when the phenomenon stems from streak lightning. Disruptive mechanical effects on non-conductors especially if containing moisture, or crushing effects on hollow conducting tubes may occur in cases where actual steep wave-front, lightning currents pass through the objects.

5. Optical Appearances

Some of the cases of "ball lightning" observed have displayed excrescences of the appearance of little flames emanating from the main body of the luminous mass, or luminous streamers have developed from it and propagated slant-wise toward the ground. In rare instances, it has been reported that the luminous body may break up into a number of smaller balls which may appear to fall towards the earth like a rain of sparks. It has even been reported that the ball has suddenly ejected a whole bundle of many luminous, radiating streamers toward the earth, and then disappeared.

Jensen¹ has quoted the following report of electrical discharges appearing in a violent storm: "A tornado which occurred on the evening of July 9, 1932, near Rock Rapids, Iowa, gave evidence of a closely related type of luminous display according to the report of Mr. George Raveling, U. S. Weather Bureau observer. From the sides of the boiling, dust-laden cloud a fiery stream poured out like water through a sieve, breaking into spheres of irregular shape as they descended. No streak lightning of the usual type was observed and no noise attended the fire-balls other than the usual roar of the storm."

(c) Possible Objects to Which Attracted

Lightning strokes are more likely to hit at or near the top of high, pointed objects, than on the surfaces of low objects with flat or concave exteriors. If the tips of the high objects are grounded via conductors such as wires or metal pipes, they will tend to show a higher frequency to strokes than ungrounded objects. This is especially true if, in the former case, the

1. Jensen, J. C., Physics, vol. 4, p. 574 (1933).

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ground is well moistened or possesses an extensive network of conducting elements (water pipes, telephone and electric cables, etc.)

It follows that the lightning flash will be observed more frequently at these relatively high points than elsewhere, and hence probably that "ball lightning" will appear to develop quite commonly at such points.

Brush discharges tend to form at sharply convex extremities of objects, and align themselves in the direction of the potential gradient. Well-grounded and conducting objects would generally receive preference. These considerations apply to cases which were classified by the layman as "ball lightning" but actually were cases of St. Elmo's Fire (bright glow or brush discharges).

There have been reports by observers of "ball lightning" to the effect that the phenomenon appeared to float through a room or other space for a brief interval of time without making contact with or being attracted by objects. Holzer and Workman¹ have published a reproduction of moving film camera photographs of unusual discharges during thunderstorms. In the case of the phenomenon observed at Santa Fe, New Mexico (elevation 7000 feet) on the night of September 3, 1936, these authors state: "The cameras were mounted rigidly on a bench in a portable laboratory. The discharge was probably about 100 feet from the cameras, although the exact distance is not known since no thunder associated with this flash could be distinguished from the general background of thunder. The discharge occurred within less than one-thousandth of a second after an intense cloud ground stroke not shown on this portion of the film. Analysis of the photographs indicates that the discharge consisted of at least four luminous darts moving with a projected velocity of the order of 10⁷ cm/sec. The most notable features of this discharge are: (1) its irregularity of path and rapid reversals in direction, (2) its proximity to ground objects with no apparent contact with the ground, (3) the beaded nature of the path, and (4) the progress of the discharge in two directions from a single point."

Note should be made of the fact that the luminous darts did not appear to be attracted to available ground objects even though they were in the vicinity of the ground. On this basis it cannot be stated whether there are any definite objects to which all cases of "ball lightning" would be attracted. We should think that sharp-pointed, grounded objects are most likely to attract "ball lightning."

1. Holzer, R. E., and Workman, E. J., Jour. of Applied Physics, vol. 10, p. 659 (1939).

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(h) Methods of Terminal Dissipation

As a rule so-called "ball lightning" of the variety which we judge to be intense brush discharge dissipates when the potential gradient diminishes to a value below the critical one for maintenance of the discharge. This generally occurs following lightning strokes which largely discharge the heavy concentrations of electric charges of opposite sign in the overlying thundercloud.

"Ball lightning" which appears to form at sharp-pointed objects as a lightning stroke approaches disappears when (a) the main lightning currents cease flowing just after contact of the stroke or (b) the space charge around the lightning channel is largely collected into the channel and transported to earth or cloud.

"Ball lightning" which appears to be a luminous dart like a meteorite rapidly falling (or rising) along the path of an immediately preceding or succeeding lightning stroke disappears into the earth (or cloud).

"Ball lightning" in the form of a luminous ball apparently moving through a space or rolling along the ground dissipates eventually, perhaps on making contact with some object. Some observers have stated that the ball collapses with a noise resembling that of a big firecracker, leaving an odor of ozone. It seems probable that in these cases also the dissipation takes place when the potential gradient has diminished below the critical value for maintenance of the discharge, simultaneously with the occurrence of a genuine lightning stroke to the area involved.

As indicated previously, reports have also been given that the main body of the "ball lightning" has appeared to have broken up into a number of smaller "balls" which have fallen to earth, or to have emitted small streaks, like lightning, projected towards the earth, and thus dissipated.

A sound of thunder, of greater or lesser intensity, may accompany the dissipation. It is not possible to be certain that the sound is always intimately connected with the phenomenon, for it may have been the thunder associated with a nearby lightning stroke.

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III. Recommended Material for Questionnaire

1. Name and address of person who observed phenomenon
2. Age, education and employment of person
(Specify especially training, if any, in scientific fields such as physics, engineering, etc.)
3. Name, address and educational qualifications of person who prepared questionnaire
4. Date and time of occurrence
5. Geographic location
6. Elevation
7. Character of observation point and surroundings
(State whether inside or outside; kind of structure, if any; neighboring structures or ground objects; and terrain)
8. Illumination available (natural and artificial)
9. Weather conditions (as thunderstorm, rain, overcast)
10. State whether genuine streak lightning was observed (a) before, (b) after, the "ball lightning"; and indicate time interval between phenomena
11. Indicate direction and apparent distance of such streak lightning; also objects believed to have been struck by it
12. State whether glow or brush discharges were observed (a) before, (b) after, the "ball lightning"; and indicate time interval between phenomena
13. Indicate locations at which glow or brush discharges were observed, and objects on which they appeared
14. Indicate brightness of discharge at points of occurrence referred to in (11) and (13)
15. Shape of ball lightning observed
16. Transparency of "ball" and general appearance of its exterior and periphery
17. Changes in its form

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18. Indicate whether flames or streamers emerged from it, and describe them
19. Location, distance, and height of phenomenon when first observed
20. Apparent size of phenomenon
21. Rotation, if any, observed
22. Colors
23. Brightness
24. Smoke or vapors emitted (color, odor, form, etc.)
25. Odor (during and after occurrence of phenomenon)
26. Heating effects, if any
27. Physiological effects
28. Mechanical effects
29. Electrical or magnetic effects
30. Sounds accompanying original appearance and life-span of phenomenon
31. Path taken by "ball lightning," including height and location during its life span
32. Movements of observer during phenomenon (including movements of head and eyes, if possible)
33. Speed of motion of "ball lightning"
34. Duration of phenomenon and duration of period of observation
35. Indicate any special conditions observed to attend beginning of phenomenon
36. Indicate conditions observed at time of ending of phenomenon
37. Traces, if any, left after dissipation
38. Psychological effect on observers
39. Was sound like that of thunder heard at time of its disappearance? Describe its intensity and character

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APPENDIX I

Project Grudge

Summary of AMC Evaluation of Remaining Reports



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APPENDIX I

In the following section of this report, each remaining unexplained incident is considered separately. It is not the intent to generally discredit the character of observers, but each case has undesirable elements, and these cannot be disregarded. The numerical designation is merely the categorical order of the incident in the project files.

Incident No. 1 — 8 July 1947, 0930 hours local, Muroc Air Force Base. Four witnesses, all observed two silver disc like or spherical objects against a clear bright sky. All witnesses estimated the altitude at about 8000 feet, and the speed between 300 and 400 MPH. It is possible to estimate distance and speed of an object with a fair degree of accuracy if the size is known. The distance is judged on the known size and speed on an estimate of distance, plus angular change in position (see page 8, app. G). In this incident the size could not be known, owing to the fact that the object was not identified. The time in sight and angular distance traveled were not given. However, the first witness stated he sighted the objects at 0930, and the last witness said he was called to view the objects at 1000. Time in sight is therefore assumed to be at least one-half hour. The objects reportedly traveled in a straight line. Taking the mean reported speed (350 MPH), the objects must then have traveled 175 MPH while in sight. If the objects were of such proportions as to be seen at that distance, it is believed that more details could have been observed at the first sighting. Two additional remarkable aspects of this case are:

1. A few moments previous to the sighting, the first witness was engaged in conversation. Quoting the witness, "My part in this conversation was as follows: 'Someone will have to show me one of those discs before I will believe it.'"

2. The statements of the three other witnesses were made to the first witness. All three agree almost identically with the first. It is probable, therefore, that their evidence was influenced by suggestion.

AMC Opinion: This report is a result of misinterpretation of the nature of real stimuli, probably research balloons.

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Incident No. 10 — 4 July 1947, 2004 hours, Boise, Idaho. An airline pilot and crew watched from the air two groups, (5 and 4 in number) of objects described as thin and smooth on the bottom and rough on top, silhouetted against sunset and flying "loose formation." They followed them for forty-five miles; therefore, had them in sight for approximately ten minutes. No further information was submitted.

AMC Opinion: Since the sighting occurred at sunset, when light conditions change rapidly and illusory effects are most likely, the objects could have been ordinary aircraft, balloons, birds, or pure illusion. Insufficient information.

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By VH NARA Date 2/14/99

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Incident No. 17 — 24 June 1947, afternoon, Mt. Rainier, Washington. One witness viewed nine "saucer-like discs" from the air calculated to be 20 to 25 miles distant, and 45-50 feet in length, (about 20 times as long as wide) which traveled 47 miles in 102 seconds (1700 MPH). Dr. Hynek calculated mathematically (see Appendix B) that assuming the estimate of distance to be accurate, in order to see such detail, the objects would need to have been at least 100 feet thick, therefore, 2000 feet long. If the estimated size is more nearly correct, then to have been seen as described, the objects would have been roughly six miles distant. At this distance they would have traveled only 11 miles in 102 seconds, or approximately 400 MPH. The entire report of this incident is replete with inconsistencies. It is to be noted that the observer has profited from this story by selling it to Fate magazine.

AMC Opinion: The report cannot bear even superficial examination, therefore, must be disregarded. There are strong indications that this report and its attendant publicity is largely responsible for subsequent reports.

DECLASSIFIED

Authority NPD 971337

By VH NARA Date 2/14/98

REPRODUCED AT THE NATIONAL ARCHIVES

Incident No. 21 -- 29 June 1947, 1645, Des Moines, Iowa.

The observer, a bus driver, reported observing thirteen objects at 1200 ft altitude, traveling in a straight line in file at 300 MPH. The objects were elliptical in form "inverted saucer", 12 ft thick, 175-250 ft in diameter, dirty white, and made a sound like an electric motor or dynamo. There was no further information supplied except that the observer stated they looked like dots in the sky.

AMC Opinion: These objects were seen just outside Des Moines, and were flying toward Des Moines. If they were not ordinary objects mistaken for something else by the observer, but were really unusual aircraft, it seems almost certain that someone else would have also reported them. There is insufficient information for a proper analysis.

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Authority NND 971337

By VH NARA Date 2/14/98

REPRODUCED AT THE NATIONAL ARCHIVES

Incident No. 29 — 14 June 1947, 1200 and 1415, Bakersfield, Calif. The observer, an experienced pilot, reported sighting ten and later seven objects at 8500 ft altitude, traveling 350 MPH in a loose "V" formation. Although the objects were apparently at a considerable distance, the reporter described them as being similar to the XF5U-1 "Flying Flapjack." He stated that he attached no particular importance to this sighting until he read of the Cascade Mountain sighting, (Incident No. 17). He then recalled this incident.

AMC Opinion: There is no information contained in this report to refute the assumption that these objects were ordinary aircraft beyond the range of identification. The fact that no one else in Bakersfield reported observing anything unusual, tends to substantiate this conclusion.

Incident No. 35 -- 14 October 1947, 1200 hours, eleven miles north, N.E. of Cave Creek, Arizona.

Two mine operators observed one object at 8000 to 10,000 ft altitude, traveling 350 MPH, S.E. in a straight line for a period of 45-60 seconds. The object was red against the sky, and black against a cloud. It appeared to be three feet in diameter from point of observation. The OSI report of investigation states that one observer thought it was a buzzard, but decided later that it was not; the other observer said it resembled a flying wing, but was not a flying wing. No reasons are given for these apparently superfluous and conflicting remarks. As in many other instances, these observers cite their flying experience as qualification for their ability to observe and report details.

AMC Opinion: From the limited data furnished in this report, it is difficult to arrive at any conclusion. If the object was actually 10,000 ft distant, and yet appeared three feet wide to the observer, it would of necessity been huge. This sole point of contention tends to discredit the report.

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Authority NO 971337

By VH NARA Date 2/14/98

REPRODUCED AT THE NATIONAL ARCHIVES

Incident No. 37 -- 14 October 1947, 1200 hours, eleven miles North,
N. E. of Cave Creek, Arizona.

Two mine operators observed one object at 8000 to 10,000 ft altitude, traveling 350 MPH S.E. in a straight line for a period of 45-60 seconds. The object was red against the sky, and black against a cloud. It appeared to be three feet in diameter from point of observation. The OSI report of investigation states that one observer thought it was a buzzard, but decided later that it was not; the other observer said it resembled a flying wing, but was not a flying wing. No reasons are given for these apparently superfluous and conflicting remarks. As in many other instances, these observers cite their flying experience as qualification for their ability to observe and report details.

AMC Opinion: From the limited data furnished in this report, it is difficult to arrive at any conclusion. If the object was actually 10,000 ft distant, and yet appeared three feet wide to the observer, it would of necessity be huge. This sole point of contention tends to discredit the report.

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Incident No. 40 -- 7 July 1947, 1600 hours, Phoenix, Arizona. One observer witnessed an elliptical, flat, gray object, measuring 20-30 ft across, flying 400-600 MPH, spiraling downward to 2000 ft from 5000 ft, then ascending at a 45° angle into an overcast. Observer ran into a garage where he obtained a Kodak Brownie 120 box camera, and snapped two pictures; one negative, and a print of the other, are contained in project files. The negative displays a small apparently flat object rounded on one end, and pointed on the other. The object appears to have a hole in the center. The image is in stark contrast with the background of clouds. From the print, the object appears to be jet black with sharp outlines. Four expert photographers concur in the opinion that the image is of true photographic nature. However, they disagree with each other as to the possibility of filming such an occurrence under the conditions described. Considering the object was grey as described, and at a distance of 2000 feet, it seems unlikely that it would appear pure black on the print. In subsequent correspondence to the reporter of this incident, the observer refers to himself as Chief of Staff of Panoramic Research Laboratory, the letterhead of which lists photography among one of its specialities. Yet, the negative was carelessly cut and faultily developed. It is covered with streaks and over a period of six months, has faded very noticeably. An OSI agent discovered that a letter by this observer was published by Amazing Stories magazine early this year. In this letter he stated that he had been interviewed by two Federal agents, had given them pictures of "flying discs" and that the pictures had not been returned. He requested the advice of the magazine as to how to proceed to sue the Government. This individual is aware of the whereabouts of these pictures, but has never requested their return. There are other undesirable aspects to this case. The observer's character and business affiliations are presently under investigation, the results of which are not yet known. Dr. Irving Langmuir studied subject photographs, and after learning of the prior passage of a thunderstorm, discounted the photographed object as being merely paper swept up by the winds.

AHC Opinion: In view of the apparent character of the witness, the conclusion by Dr. Langmuir, seems entirely probable.

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Authority NPD 971337

REPRODUCED AT THE NATIONAL ARCHIVES

By VH NARA Date 2/14/98

Incident No. 51 -- 3 September 1947, 1215 hours, Oswego, Oregon.
A housewife observed twelve to fifteen round, silver-colored objects at a high altitude. No further information was submitted, therefore, no conclusion can be reached.

DECLASSIFIED

Authority NO 971337

By VH NARA Date 2/14/98

REPRODUCED AT THE NATIONAL ARCHIVES

Incident No. 58 — 4 August 1947, Sunset, near Bethel, Alaska.

A pilot and his co-pilot observed a black object of the design and approximate dimensions of a C-54 fuselage, flying at 500-1000 ft altitude N.W. The object crossed their path at right angle, and they pulled up to 1200 ft to avoid a collision, then chased it at 170, but lost sight of it in four minutes. They estimated the speed of the object to be three times their own, or 510 MPH. Assuming the estimate of speed to be correct, elementary computations determine the distances object traveled as 34 miles in four minutes while the observer's airplane moved eleven miles in the same period. Therefore, the object was more than twenty miles distant when last seen. To be capable of being seen at this distance under the conditions given, the object would have to be about 50 feet in its smallest or end-on dimension. If this were true, and the object was proportionate with a C-54 fuselage, its length would be about 500 ft. Assuming the estimate of speed to be incorrect, but time in sight to be correct, the problem is figured in reverse, using as a reasonable width 15 feet. In this event the object would have been less than ten miles away when lost to sight, therefore, it would have traveled about eighteen miles in four minutes, giving a speed of less than 300 MPH.

AIC Opinion: It is believed that the pilots were suddenly startled by a conventional aircraft crossing their path, and that as they gave chase to the aircraft which was "silhouetted against a brilliant evening sky", they were partially blinded, and were therefore unable to discern wings or engines.

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Authority NND 971337

REPRODUCED AT THE NATIONAL ARCHIVES

By VH NARA Date 2/14/98

Incident No. 62 -- 3 September 1947, 2230-2300 hours, Logan, Utah.
A man and his wife, together with five other unidentified people, observed five groups each of 35-60 small objects, yellowish-white in color, flying several thousand feet in the air at a high rate of speed. The weather was cloudy.

AKC Opinion: From the limited evidence submitted, it is practically impossible to formulate a conclusion. Fast motion could be attributed to closeness rather than to true linear distance. In an atmosphere of darkness, any impression may be erroneous. Ground lights reflected from moving, low-hanging clouds, themselves not visible, could readily account for this report. Light colored birds are another possibility.

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Authority NND 971337

By VH NARA Date 2/14/88

REPRODUCED AT THE NATIONAL ARCHIVES

Incident No. 61 -- 19 August 1947, 2130 hours, Twin Falls, Idaho. Several people were reported as sighting numerous groups of objects in the night sky. These objects were described as a glow in the air with a color similar to regular electric lights. The objects were said to have traveled at "terrific" speed. Some flew in triangular formation. Three objects peeled off of one group of ten, and proceeded on another course. The sky was overcast. Two observers stated that the objects could not have been birds since the lights were not a reflection of city lights.

AMC Opinion: Many familiar objects visible because of the fact that they reflect light, appear to be incandescent; for example, the moon and certain planets. The evidence is, therefore, contradictory since in one instance the objects are described as merely a glow, and later on as not being reflectory. The submitted evidence is readily explained as in incident 62; ground lights reflected from clouds, or birds in flight.

Incident No. 68 -- 24 June 1947, Daytime, Cascade Mountains, Washington. A prospector reported sighting five or six round objects with tails, 1000 ft overhead, heading S.E., and banking in the sun. The objects were in sight 45-60 seconds, and alleged to be thirty feet in diameter. They made no noise. While the objects were within sight, the observers compass fluctuated wildly. He states that he read of a former sighting (incident No. 17) also occurring on 24 June 1947, and submitted this report solely to add credence to the person who provided that story. While there appears to be an attempt on the part of the observer to infer that these objects were possibly the same as those reported in (incident No. 17), there are several major differences, notably as Dr. Hynek points out (app.B), that these objects had tails, and that the inferred size, as determined from the estimated distance, is quite different. Dr. Valley (App D) has pointed out and Dr. Hynek concurred that it is difficult to take seriously the peculiar action of the compass for this would imply fantastically large magnetic fields.

AMC Opinion: From the limited evidence submitted, it is impossible to reach a definite conclusion. However, two possible psychological factors are readily apparent; one, the observer stated he submitted this report solely because he had read several days following his observation of another sighting. Therefore, he very likely either consciously or inadvertently may have attempted to conform his report to that recounted in the newspaper; and two, he colored his report with inference of huge magnetic fields, as to the implications of which he was obviously uninformed.

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Authority NPD 971337

REPRODUCED AT THE NATIONAL ARCHIVES

By VH NARA Date 2/14/98

Incident No. 71 — 8 or 9 October 1947, daytime, Las Vegas, Nevada. An Air Force Reserve pilot reported observing a trail appearing high in the sky at an estimated speed of 400-1000 MPH. The object producing the trail was not visible. The trail was white as a cloud, and dissipated in fifteen to twenty minutes. The object proceeded in a straight line, then it made an approximately 180° turn of radius five to fifteen miles, and proceeded away toward the direction of first appearance. The weather was described as "almost cloudless."

AMC Opinion: It is difficult to understand why this individual attached any importance to this sighting, and why he did not conclude that the trail was caused by exactly what it appears to have been; that is, an ordinary aircraft flying normally at an altitude too high for itself to be visible, but in the best altitude range to form vapor trails 20,000 - 45,000 feet.

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Authority NND 971337

By VH NARA Date 2/14/98

REPRODUCED AT THE NATIONAL ARCHIVES

Incident No. 75 -- 13 August 1947, 1300 hours, Snake River Canyon, Idaho. A farmer together with his two sons, ten and eight years of age, witnessed an object move down a canyon. It was in view only momentarily at a distance of 300 feet, and approximately 75 feet above the ground. The object made a swishing sound, and was sky-blue in color. The farmer doubted the possibility of its visibility if viewed against the sky. The children told of smokeless turbine or exhaust flames shooting from the device through which could be seen daylight. The object passed over some trees, which in the words of the farmer, "spun around on top as if they were in a vacuum."

AMC Opinion: It seems logical to concur with Dr. Hynek's deduction, that this object was simply a rapidly moving atmospheric eddy.

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Authority ND 971337

REPRODUCED AT THE NATIONAL ARCHIVES

By VH NARA Date 2/14/98

Incident No. 76 -- 13 August 1947, Salmon Dam, Idaho.

Two men reported simultaneously hearing a roar, and looking up observed two objects of undetermined size, several miles distant at a great height which they thought might have been 4000-6000 feet. The objects were "circular", "reflected light", and were traveling at "great speed". Although occurring on the same day as Incident No. 75, the descriptions vary widely.

AMC Opinion: There is no information contained in this report to refute the assumption that these men saw two ordinary aircraft at too great a distance to discern details.

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Authority NPD 971337

REPRODUCED AT THE NATIONAL ARCHIVES

By VH NARA Date 2/14/98

Incident No. 77 -- 3 July 1947, 1430 Hours, South Brooksville, Maine.

This observer, an "astronomer", heard a loud roar and with difficulty observed at 50° elevation approximately ten very light-colored objects traveling N. W. The group is reported to have covered 1 1/2° angular diameter in the sky, bunched together with no regular formation. He calculated that at a distance of 10 miles the objects would have a speed of 1200 MPH; that their width must be 100 feet across and due to their color would be barely visible. He also estimated the object would have a width of fifty feet at five miles with a speed of 600 MPH. He believed they were aircraft of some type, owing to the loud roar. In his letter he asked, "have any meteorites been reported?"

AMC Opinion: It is believed that the observer should have been able to rule out the possibility of meteorites. Reducing the estimate of distance, and correspondingly reducing the required size to that of objects such as birds or insects, then the speeds become very modest. If the objects were actually five to ten miles distant, and responsible for the "unusually loud roar", it is expected that numerous other reports would have been received from this section of Maine, which is thickly populated.

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Authority NND 971337

By VH NARA Date 2/14/98

REPRODUCED AT THE NATIONAL ARCHIVES

Incident No. 79 -- April 1947, Richmond, Virginia

A weather bureau observer at the Richmond Station observed on three different occasions, during the six-month period prior to April 1947, a disc-like metal chrome object. All sightings were made through a theodolite while making pibal observations. On the last reported sighting, the balloon was at 15,000 feet altitude, the disc followed for fifteen seconds. It was shaped like an ellipse with a flat level bottom and a dome-like top. The altitude and speed were not estimated, but the object, allegedly through the instrument, appeared larger than the balloon. Another observer at the same station saw a similar object under corresponding circumstances, with the exception that her balloon was at an altitude of 27,000 feet and possessed a dull metallic luster. There was good visibility on days of observation. Report of this sighting was not submitted until 22 July 1947.

*AMC Opinion: There is no readily apparent explanation. If there were only one such object, it seems amazingly coincidental that it would be seen four times near the pibal of this station only. On the other hand, there would have to have been a great number of these objects to rule out coincidence, and as the number of objects increases so do the chances of sightings by other witnesses.

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Authority NND 971337

REPRODUCED AT THE NATIONAL ARCHIVES

By VH NARA Date 2/14/98

Incident No. EL -- 7 July 1947, 1300-1400 Hours, Lakeland, Fla. One observer reported hearing a swishing noise and then seeing, five shiny objects climbing from 5000 ft to 7500 ft in fifteen to thirty seconds. He estimated the objects were one mile from him. The lead object was of plastic appearance and appeared to be towing the other four. The reporter made a model and submitted it as an exhibit. The model is roughly two feet in diameter, domed top and bottom and with an opening in the rear on either side of a vertical fin. Police records list the man as having been AWOL from the Navy on two occasions. A neighborhood and employment check disclosed he is an excitable person, very talkative, possessing an exaggerated imagination, and inclined to impress people with his continuous verbal chatter.

AMC Opinion: This incident has all the aspects of a psychopathological report.

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Authority NO 971337

By VH NARA Date 2/14/98

REPRODUCED AT THE NATIONAL ARCHIVES

Incident No. 111 -- 1 April 1947, 0955 Hours, Central Phillipines. An F-47 pilot leading three other aircraft at 1500 ft saw an object approximately three miles away at 1000 ft. Object appeared to be a flying wing thirty by twenty feet, silver in color. The pilot turned to intercept the object and the object turned on nearly the same course and disappeared from sight in five seconds. Object appeared to have a dorsal fin but distance was too great to note any other features. The report does not reveal whether any of the other pilots saw the object.

AMC Opinion: No definite explanation. However, every pilot has experienced the sensation of seeing an aircraft obliquely at nearly the limit of vision and then losing sight at the same range when the aircraft presented, in stern view, a smaller surface.

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Authority NND 971337

By VH NARA Date 2/14/98

REPRODUCED AT THE NATIONAL ARCHIVES

Incident No. 122 -- 5 April 1948, Holloman Air Force Base, New Mexico.

Three balloon observers saw an object very high in the sky, moving faster than any known aircraft and possessing a rounded indistinct form, which disappeared suddenly. It was seen less than thirty seconds and was apparently not manned, judging by its violent maneuvers. For analogous size they stated if the moon were the size of an orange the object would approximate the size of a disc.

AMC Opinion: No explanation. However, the above comparison of size is to be noted. A dime held at arms length would shield the moon from the eye even if the moon appeared several times larger than it does. To reduce the proportion then, this object must have appeared as an infinitesimal point. From trained observers, this is certainly a major discrepancy.

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Authority NND 971337

REPRODUCED AT THE NATIONAL ARCHIVES

By VH NARA Date 2/14/98

Incident No. 134 -- 23 May 1948, 1500 Hours, Monroe, Michigan.
One passenger in a C-47 at 8000 ft observed three disc-like objects and later two more (another observer saw only the two). The objects appeared to descend from above, level off at altitude of C-47 and travel in the opposite direction at frost speed. They left no trail, were disc shaped and were "silvery-gold" or "shiny brass" in color. One observer said they were 300-400 feet across with well rounded contours, the other said they were four feet in size. The first observer later said all had a hazy or fuzzy outline. There was an overcast at 15,000 feet and a thin, broken stratus layer at 8000 feet, the level of the aircraft.

AMC Opinion: Dr. Hynek suggests these individuals could have seen successive shafts of sunlight through breaks in the high overcast illuminating portions of the lower cloud stratum. Apparent speed could be a combination of projected motion of the break in the overcast and the velocity of the C-47. This explanation partially fits the contradictory evidence.

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Authority NND 971337

REPRODUCED AT THE NATIONAL ARCHIVES

By VH NARA Date 2/14/98

Incident No. 135 -- Between 15 and 20 August 1947, 2130 Hours,
Weaver, South Dakota.

An Air Force Officer saw twelve "flying discs" four miles away over the Rapid City Air Force Base in a tight diamond formation at 10000 to 10,000 feet descending to 6000 feet at 500 MPH. Objects made a formation turn and climbed at 30° to 40° accelerating. Objects were very maneuverable, remaining equally spaced in all maneuvers. Each object was 100 feet in length, oval-shaped and brilliant yellowish-white. No sound nor exhaust trail were heard or seen.

AMC Opinion: This reporter should be a reliable observer. However, it has been shown that distance cannot be estimated without prior knowledge of the size of an object. If distance is not known, speed cannot be estimated. More notable perhaps is that such minute detail could be remembered in a report made one year after the observation and yet the date was not remembered. Dr. Hynek suggested the possibility of detached auroral streamers.

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Authority NND 971337

By VH NARA Date 2/14/98

REPRODUCED AT THE NATIONAL ARCHIVES

Incident No. 151 -- 29 July 1948, 0955 hours, Indianapolis, Indiana.

The observers driving a truck saw an object shaped like a broad short propeller traveling 25-30 MPH in a bank just above the trees at thirty feet altitude. It was eight feet long, two feet wide and one foot thick, with "cup" on the upper sides of the blades. The object glided with no spinning action, and there was no sound or trail. The object was thought to have fallen, but a search revealed nothing.

AMC Opinion: No satisfactory conclusion can be drawn.

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Authority NND 971337

REPRODUCED AT THE NATIONAL ARCHIVES

By VH NARA Date 2/14/98

Incident No. 152 -- 31 July 1948, 0825 Hours, Indianapolis, Indiana.

A man and his wife saw an object shaped like a cymbal, lusterless white in color, at an altitude of 2000 ft. The object moved across the sky to the east at approximately 1800 MPH, on a level course and shimmering in the sun, giving the appearance of spinning. It was twenty feet in diameter and six to eight feet high in the center. There was no sound or exhaust.

AMC Opinion: This object could conceivably be the same at different angles as that seen in Incident 151, although all the remaining evidence is widely divergent. No satisfactory conclusion can be drawn.

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Authority NND 971337

REPRODUCED AT THE NATIONAL ARCHIVES

By VH NARA Date 2/14/98

Incident No. 154 -- 2 August 1945, 1945 Hours, Columbus, Ohio
An attorney and his wife observed an object moving south over the center of Columbus at 1500-2000 ft altitude. During the ten to fifteen minutes the object remained in sight, it changed shape from that of a parallelogram to a circle and back again, direction of travel remained constant. Once it seemed to hesitate and a thin trail of smoke appeared from the rear. The smoke disappeared soon. The outline of the object was dark gray or black, but the center seemed to be transparent. Object was judged to be 20 to 30 feet in diameter.

AMC Opinion: There is no reason to believe other than that this object was a research balloon, of which there are many types, and that the "trail of smoke" appeared so from a momentary glimpse of trailing apparatus.

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Authority NND 971337

REPRODUCED AT THE NATIONAL ARCHIVES

By VH NARA Date 2/14/98

Incident No. 162 -- 11 August 1948, 1200 Hours, Hamel, Minnesota.
Two children, ages ten and eight, described a dull gray object two feet in diameter and one foot thick, shaped like two plates together which settled gently to the ground. It clanked when it touched down. On the ground it emitted a whistling noise and "shot" up to twenty feet where it hesitated, whistled once more, "shot" up to thirty feet, then "shot" off in a northeast direction.

AMC Opinion: This apparent bit of fantasy is hardly worth further consideration.

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Authority NND 971337

REPRODUCED AT THE NATIONAL ARCHIVES

By VH NARA Date 2/14/98

Incident No. 168 -- 20 July 1948, 1330 Hours, Arnheim, The Hague.

One observer saw an object intermittently through clouds four times. The object had two decks and no wings, was said to be very high, with speed comparable to V-2.

AMC Opinion: Insufficient information. It may be well to point out that the V-2 is not visible in flight, therefore, it follows that this object would not have been visible as described if traveling at that speed.

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Authority NPD 971337

REPRODUCED AT THE NATIONAL ARCHIVES

By VH NARA Date 2/14/98

Incident No. 176 -- 23 Sept. 1948, 1200 Hours, San Pablo, Calif.
On a dull hazy day, two men saw a large translucent object over a mile overhead. It was the size of a four-engine bomber, buff-gray in color, and appeared to be made of canvas. According to the first observer, the center portion was spherical and undulated, having appendages fore and aft, like an amoeba. The second observer said the object looked like a "vegetable crate" covered with translucent material. The investigator states one observer's description was in direct contradiction to the other. One observer was far-sighted but wore no glasses, the other was over seventy, needed glasses to read but wore none at time of sighting.

AMC Opinion: The only fact that might be accepted is that an object was seen. Two observers, side by side, could not agree on its appearance. The evidence is useless. A balloon or cluster of balloons, an aircraft, or a cloud could have been the stimulus.

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Authority NND 971337

REPRODUCED AT THE NATIONAL ARCHIVES

By VH NARA Date 2/14/98

Incident No. 183 -- 15 Oct. 1948, 2305 Hours, Fusnoka Area,
Japan.

Airborne radar observer in F-61 attempted six times to intercept an object between 5000 and 6000 ft. The object traveled 200 MPH until approached to within 12,000 ft., then quickly accelerated from scope at estimated 1200 ft. Object appeared to be 20-30 ft long. Pilot saw silhouette on undercast of object with rounded nose, general projectile shape, cut off sharply at rear.

AMC Opinion: There is no apparent explanation. One discrepancy seems to be that the target was never seen by ground radar, which was operating and had the F-61 in sight throughout period of sighting.

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Authority NND 971337

REPRODUCED AT THE NATIONAL ARCHIVES

By VH NARA Date 2/14/98

Incident No. 186 -- 16 Oct. 1948, 1145 Hours, eight miles east of Sterling, Utah.

One observer on mountain at 9000 ft heard a throbbing noise, then saw one object 9 inches long, three inches thick, and six inches wide traveling horizontally at 300 MPH, 500 ft overhead. It was black with a wide silver stripe on underside center. Investigator states observer's ability to estimate distances is poor. In sight approximately four seconds.

AMC Opinion: Information indicates no explanation.

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Authority NPD 971337

REPRODUCED AT THE NATIONAL ARCHIVES

By VH NARA Date 2/14/98

Incident No. 193 -- 24 Oct. 1948, between 1100 and 1330 GMT,
Neubiberg, Germany.

An Air Force Officer heard a sound like an F-47 at high altitude,
looked up and saw a dark object shaped like a coin at undetermined al-
titude, 60° elevation flying southwest at fast undetermined speed in
level flight.

AMC Opinion: There is nothing to controvert the conclusion that
this object was a conventional aircraft at a range outside the limit
of visual resolution.

Incident No. 207 -- 18 Nov. 1948, 2200 Hours, Andrews Air Force Base, Maryland.

The pilot of a T-6 reported seeing an object over the base at 1700 feet. Object was an oblong ball with one light, no wings, no exhaust, in landing light of T-6. It had a dull gray glow and was thought to be smaller than the T-6. Pilot made passes and object evaded by going above aircraft. T-6 tried to close in very tight climbing turns, but object turned inside the aircraft. Object was lost after ten minutes at 7500 feet. Its speed seemed to vary between 80 MPH and 60 MPH.

AMC Opinion: That the object described was a synoptic balloon. Dr. Fitt's report shows that it is very difficult for the observer to separate target motion and his own motion even in daylight, and practically impossible to do so at night. This fact has been substantiated by the writer, who in controlled experiments attacked ordinary balloons with a T-6. In daylight, and with knowledge of what the object was and what it did, all the above described maneuvers were duplicated in appearance.

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Authority NND 971337

REPRODUCED AT THE NATIONAL ARCHIVES

By VH NARA Date 2/14/99

Incident No. 215 -- 3 Dec. 1948, 2015 Hours, Fairfield-Luisan
Air Force Base, California.

The base control tower operator saw for 25 seconds a bright white light in the air. It came into view two miles away at 500 to 1000 ft, climbing slowly at 400 MPH; at 1500 ft it slowed for a few seconds to 200 MPH; at this time, it undulated or bounced; rose vertically to 3000 ft and immediately afterwards climbed quickly to 20,000 ft and was lost to sight.

AMC Opinion: There is no logical explanation for this incident that fits the available evidence.