

USAFE AIDS TO IDENTIFICATION OF

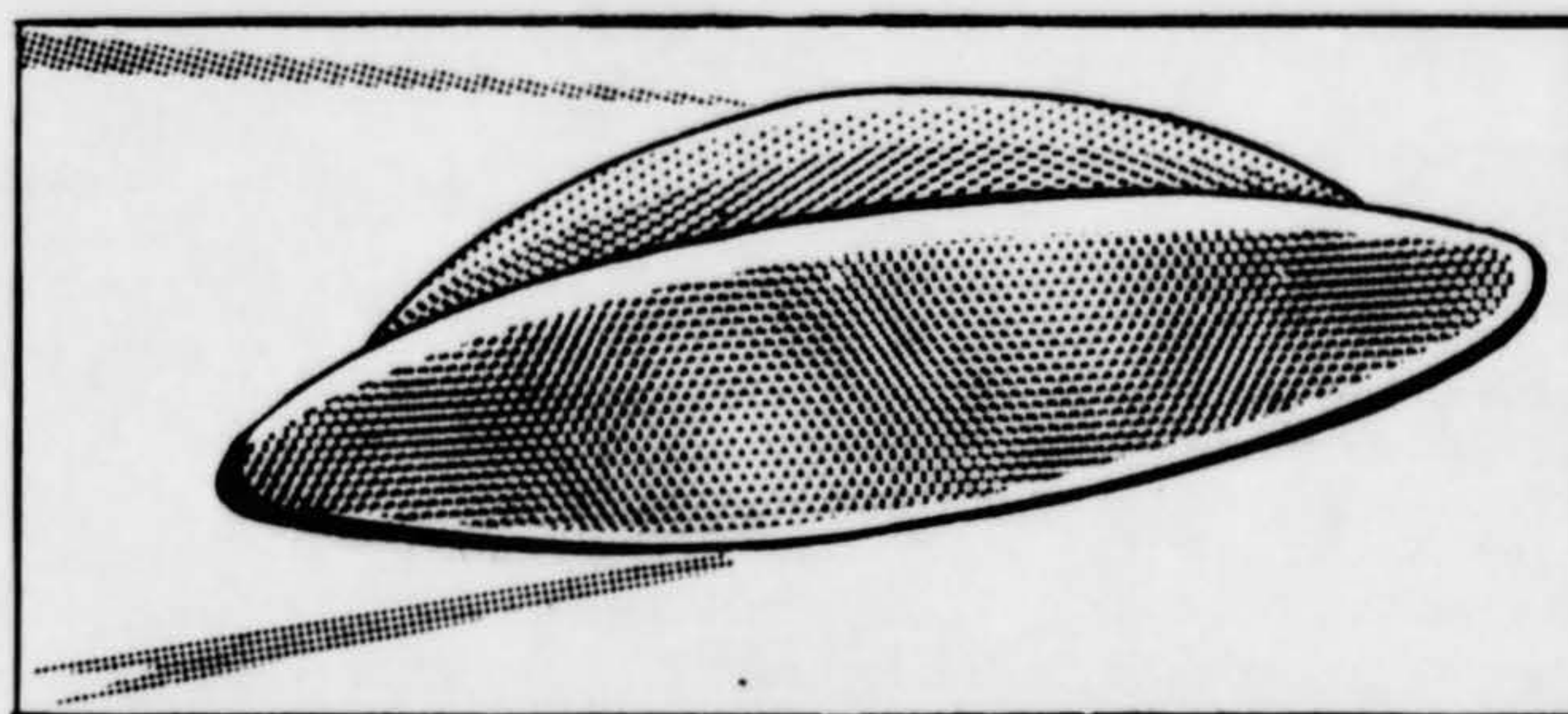
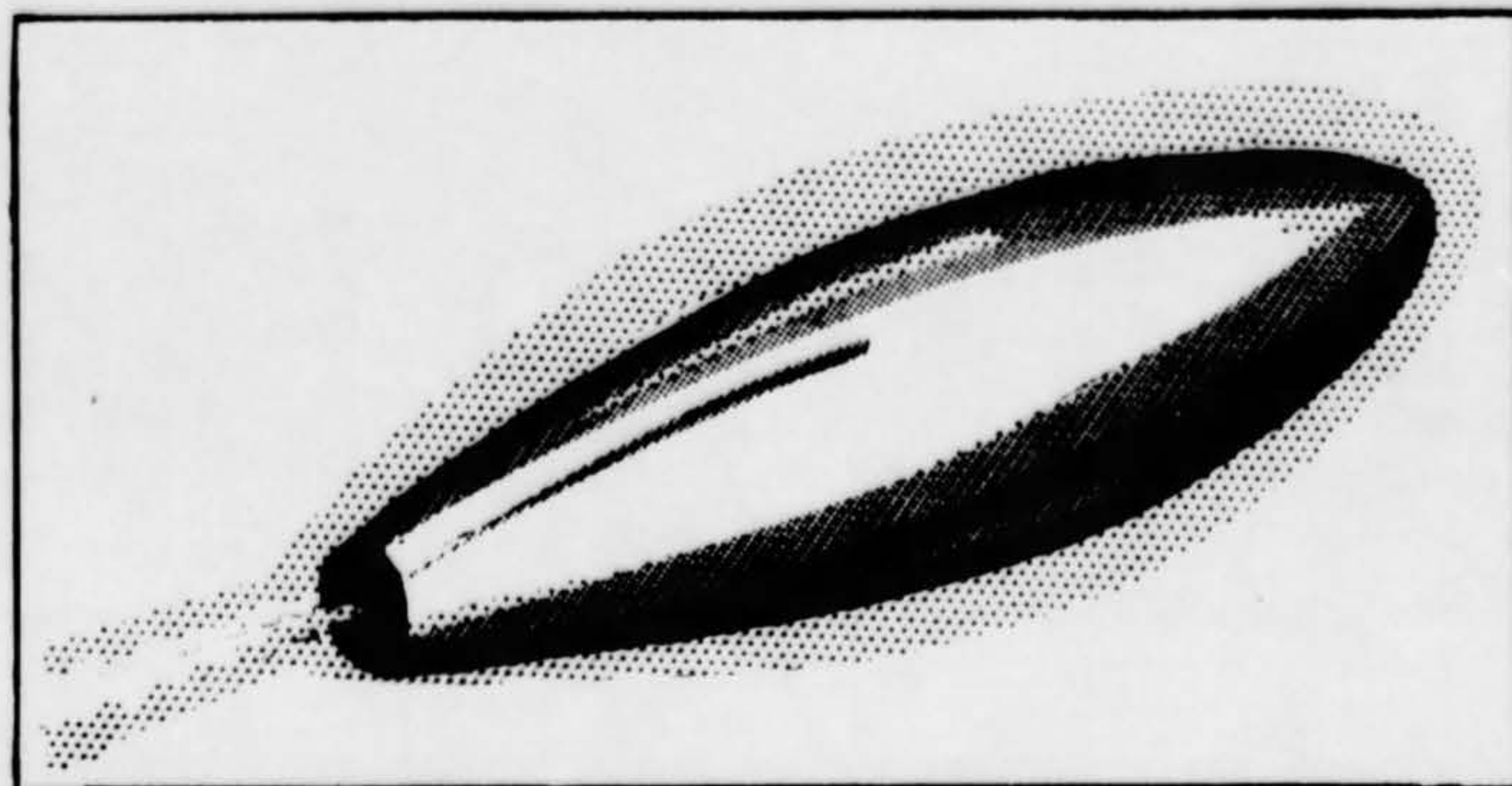
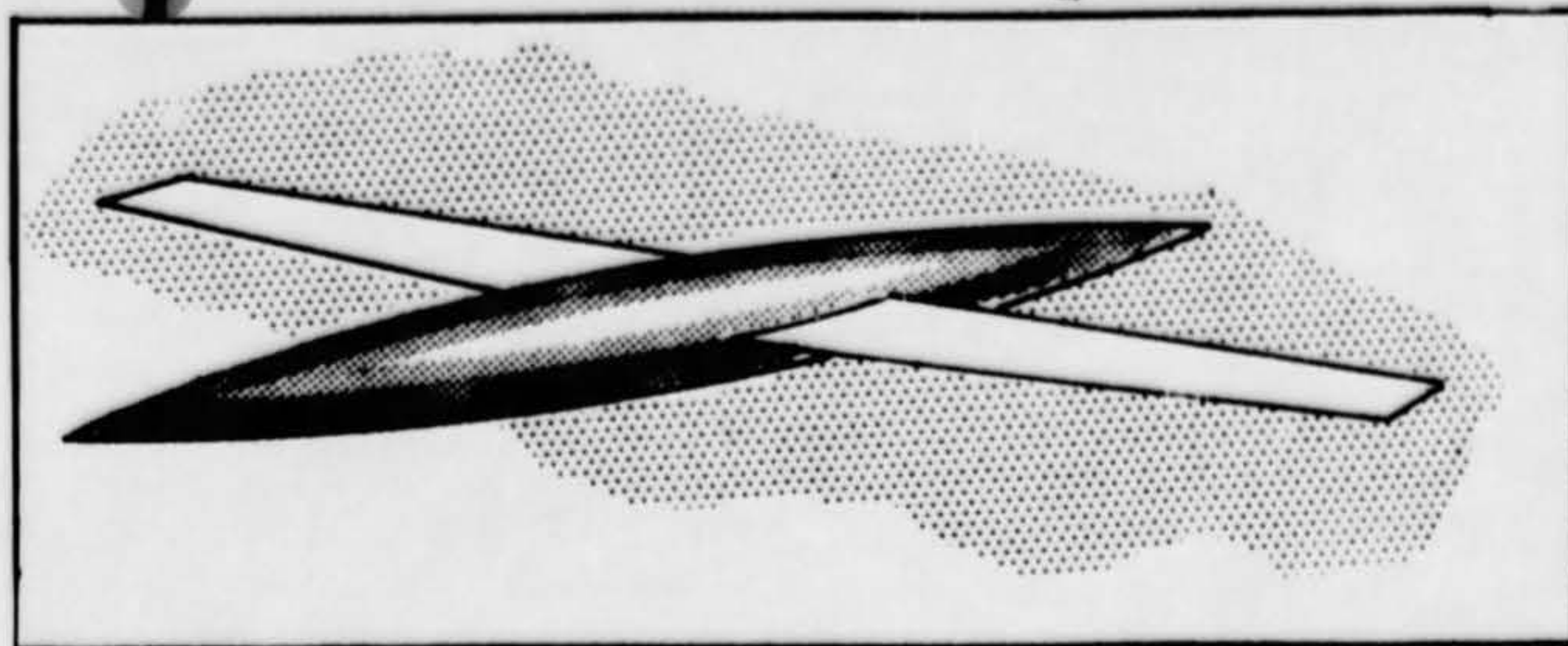
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RETURN TO

USAF Historical Archives
ASI(ASHAF-A)
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These illustrations were reproduced on the basis of information from reports of sightings and are discussed in the preceding text.

C. Example of Diagram Use:

1. Verbal Description of Example Sighting: Object was first sighted in the southeast, about half-way up from the horizon to overhead, at 10:45 PM local time. Its shape or outline was hazy, but appeared round and about the size of a pea (at arm's length) from where observed. It was dim at first but brightened considerably as it got higher in the sky. Its color at this point was bluish white. After about two minutes it crossed to the western part of the sky a little to the north of overhead (zenith) and continued its flight toward the west. At this point its color appeared yellowish white. The light went dim when it got two-thirds of the way to the horizon. It then stopped and hovered for about one minute and then climbed rapidly, going toward the southwest and getting brighter. In less than thirty seconds, it had climbed to an elevation of approximately 60 degrees, and then the light went out abruptly.

2. Pictorial Description of the Sighting: By referring to the example sheet, notice how simply the above sighting can be portrayed and described, without words, on the example diagram attached here. Note the starting point at bearing 135 degrees (southeast) and elevation 45 degrees (half-way up from the horizon) at 10:45 PM (Military time, 2245), and also the arrow marking direction of flight. Note also the varying thickness of the line to denote changes in brightness, and the use of the dotted line to indicate its path in the western part of the sky. The "time indications" along the path - 2 minutes to get to the meridian (the north-south overhead line), the hovering for 1 minute, and the ascent in 30 seconds to its complete disappearance, are all shown with a few lines. Thus, the entire sighting can be represented easily on one diagram.

D. Further Instructions and Information:

1. Relatively complex trajectories can be shown easily on a diagram of this type. A number of objects sighted also can be indicated, as can any changing formation. The apparent size and shape of the object should be drawn in, preferably by the observer. In the case of an object changing shape, this likewise can be drawn in. Together with the detailed information and data from the "UFO Tech Sheet," both the investigator and analyst will now have a better, detailed picture of what took place. It is clear here that one picture-diagram is worth many words.

2. It will be found that the use of sky diagrams will provide an excellent means of making confirmations, and checking discrepancies or contradictions in reports from two or more observers of the same sighting. A glance at the several drawings will serve to show whether the various observer's stories are consistent or support each other, a matter which is much more difficult to determine by attempting to compare numerous written statements.

3. It is recommended that the actual observer make the drawings, unless circumstances such as physical inability or other reasons make this impossible or difficult. The investigator should not influence the observer's drawing in any way, and should provide assistance only on those points which are not clear to the observer. However, if the observer fails to grasp the idea of the diagram

(itself some indication of his value as a reliable observer), the investigator or interrogator should make the drawing from the observer's verbal description. The completed diagram should always be given to the observer to check and approve.

4. In some cases where the investigator makes the drawing for the observer, it may be advisable for the investigator to deliberately make a mistake or two in the drawing, to see whether the observer is sure of his facts to catch the error when given the diagram to check. This "reliability check" should be used with tact and discretion.

5. The landscaping in the sky diagram is placed there to help visualization. If any prominent landmarks such as known mountains, buildings, water towers, or specific installations and trees, etc. are part of the sighting area, they should be incorporated into the drawing. They may later prove to be invaluable as location, plotting or reference points in subsequent investigations of the area or sighting in question.

6. Where the observer has some familiarity with the constellations or other heavenly bodies, he should indicate, if possible, the relationship (and movements) of the object with respect to these bodies. This can be sketched on either page 6, item 33 or pages 9-10 of "Summary Data" sheet. Typical examples that can be easily illustrated: "...The object seemed to pass very slowly between the two bottom stars of the handle of the Big Dipper. The Big Dipper was in a vertical position, with the handle pointing down," or "...Object was about the size of a tennis ball - and remained stationary slightly below about 15 degrees and to the left of the moon."

7. The sky diagram is not meant to replace written statements or reports, but to supplement them, aiding the investigator to visualize the sighting and the observer to recall the original circumstances.

NEWS RELEASE

PLEASE NOTE DATE



DEPARTMENT OF DEFENSE
OFFICE OF PUBLIC INFORMATION
Washington 25, D. C.

IMMEDIATE RELEASE

OCTOBER 8, 1955

LI 5-6700, Ext 75131

AIR FORCE RELEASES STUDY ON UNIDENTIFIED AERIAL OBJECTS

The results of an investigation begun by the Air Force in 1947 into the field of Unidentified Aerial Objects (so-called flying saucers) were released by the Air Force today.

No evidence of the existence of the popularly-termed "flying saucers" was found.

The report was based on study and analysis by a private scientific group under the supervision of the Air Technical Intelligence Center at Dayton, Ohio. Since the instigation of the investigation more than seven years ago, methods and procedures have been so refined that of the 131 sightings reported during the first four months of 1955 only three per cent were listed as unknown. (A summary of the report is attached.)

Commenting on this report, Secretary of the Air Force Donald A. Quarles said: "On the basis of this study we believe that no objects such as those popularly described as flying saucers have overflowed the United States. I feel certain that even the unknown three per cent could have been explained as conventional phenomena or illusions if more complete observational data had been available.

"However, we are now entering a period of aviation technology in which aircraft of unusual configuration and flight characteristics will begin to appear.

"The Air Force and the other Armed Services have under development several vertical-rising, high performance aircraft, and as early as last year a propeller driven vertical-rising aircraft was flown. The Air Force will fly the first jet-powered vertical-rising airplane in a matter of days. We have another project under contract with AVRO Ltd., of Canada, which could result in disc-shaped aircraft somewhat similar to the popular concept of a flying saucer. An available picture, while only an artists' conception, could illustrate such an object. (Photograph is available at Pictorial Branch, Room 2D780, Ext. 75331).

"While some of these may take novel forms, such as the AVRO project, they are direct-line descendents of conventional aircraft and should not be regarded as supra-natural or mysterious. We expect to develop airplanes that will fly faster, higher and perhaps farther than present designs, but they will still obey natural laws and if manned, they will still be manned by normal terrestrial air-men. Other than reducing runway requirements we do not expect vertical-rising aircraft to have more outstanding military characteristics than conventional types.

MORE

"Vertical-rising aircraft capable of transition to supersonic horizontal flight will be a new phenomenon in our skies, and under certain conditions could give the illusion of the so-called flying saucer. The Department of Defense will make every effort within bounds of security to keep the public informed of these developments so they can be recognized for what they are."

Mr. Quarles added: "I think we must recognize that other countries also have the capability of developing vertical-rising aircraft, perhaps of unconventional shapes. However we are satisfied at this time that none of the sightings of so-called 'flying saucers' reported in this country were in fact aircraft of foreign origin."

E N D

Attachment

SUMMARY

(Analysis Of Reports Of Unidentified Aerial Objects)

Reports of unidentified aerial objects (popularly termed "flying saucers" or "flying discs") have been received by the U.S. Air Force since mid-1947 from many and diverse sources. Although there was no evidence that the unexplained reports of unidentified objects constituted a threat to the security of the United States, the Air Force determined that all reports of unidentified aerial objects should be investigated and evaluated to determine if "flying saucers" represented technological developments not known to this country.

In order to discover any pertinent trend or pattern inherent in the data, and to evaluate or explain any trend or pattern found, appropriate methods of reducing these data from reports of unidentified aerial objects to a form amenable to scientific appraisal were employed. In general, the original data upon which this study was based consisted of impressions and interpretations of apparently unexplainable events, and seldom contained reliable measurements of physical attributes. This subjectivity of the data presented a major limitation to the drawing of significant conclusions, but did not invalidate the application of scientific methods of study.

The reports received by the U.S. Air Force on unidentified aerial objects were reduced to IBM punched-card abstracts of data by means of logically developed forms and standardized evaluation procedures. Evaluation of sighting reports, a crucial step in the preparation of the data for statistical treatment, consisted of an appraisal of the reports and the subsequent categorization of the object or objects described in each report. A detailed description of this phase of the study stresses the careful attempt to maintain complete objectivity and consistency.

Analysis of the refined and evaluated data derived from the original reports of sightings consisted of (1) a systematic attempt to ferret out any distinguishing characteristics inherent in the data of any of their segments, (2) a concentrated study of any trend or pattern found, and (3) an attempt to determine the probability that any of the UNKNOWNS represent observations of technological developments not known to this country.

The first step in the analysis of the data revealed the existence of certain apparent similarities between cases of objects definitely identified and those not identified. Statistical methods of testing when applied indicated a low probability that these apparent similarities were significant. An attempt to determine the probability that any of the UNKNOWNS represented observations of technological developments not known to this country necessitated a thorough re-examination and re-evaluation of the cases of objects not originally identified; this led to the conclusion that this probability was very small.

MORE

The special study which resulted in this report (Analysis of Reports of Unidentified Aerial Objects, 5 May 1955) started in 1953. To provide the study group with a complete set of files, the information cut-off date was established as of the end of 1952. It will accordingly be noted that the statistics contained in all charts and tables in this report are terminated with the year 1952. In these charts, 3201 cases have been used.

As the study progressed, a constant program was maintained for the purpose of making comparisons between the current cases received after 1 January 1953, and those being used for the report. This was done in order that any change or significant trend which might arise from current developments could be incorporated in the summary of this report.

The 1953 and 1954 cases show a general and expected trend of increasing percentages in the finally identified categories. They also show decreasing percentages in categories where there was insufficient information and those where the phenomena could not be explained. This trend had been anticipated in the light of improved reporting and investigating procedures.

Official reports on hand at the end of 1954 totaled 4834. Of these, 425 were produced in 1953 and 429 in 1954. These 1953 and 1954 individual reports (a total of 854), were evaluated on the same basis as were those received before the end of 1952. The results are as follows:

Balloons	16 per cent
Aircraft	20 per cent
Astronomical	25 per cent
Other	13 per cent
Insufficient Information	17 per cent
Unknown	9 per cent

As the study of the current cases progressed, it became increasingly obvious that if reporting and investigating procedures could be further improved, the percentages of those cases which contained insufficient information and those remaining unexplained would be greatly reduced. The key to a higher percentage of solutions appeared to be in rapid "on the spot" investigations by trained personnel. On the basis of this, a revised program was established by Air Force Regulation 200-2, Subject: "Unidentified Flying Objects Reporting" (Short Title: UFOB), dated 12 August 1954.

This new program, which had begun to show marked results before January 1955, provided primarily that the 4602d Air Intelligence Service Squadron (Air Defense Command) would carry out all field investigations. This squadron has sufficient units and is so deployed as to be able to arrive "on the spot" within a very short time after a report is received. After treatment by the 4602d Air Intelligence Service Squadron, all information is supplied to the Air Technical Intelligence Center for final evaluation. This cooperative program has resulted, since 1 January 1955, in reducing the insufficient information cases to seven percent and the unknown cases to three percent of the totals.

The period 1 January 1955 to 5 May 1955 accounted for 131 unidentified aerial object reports received. Evaluation percentages of these are as follows:

Balloons	26 per cent
Aircraft	21 per cent
Astronomical	23 per cent
Other	20 per cent
Insufficient Information	7 per cent
Unknown	3 per cent

All available data were included in this study which was prepared by a panel of scientists both in and out of the Air Force. On the basis of this study it is believed that all the unidentified aerial objects could have been explained if more complete observational data had been available. Insofar as the reported aerial objects which still remain unexplained are concerned, there exists little information other than the impressions and interpretations of their observers. As these impressions and interpretations have been replaced by the use of improved methods of investigation and reporting, and by scientific analysis, the number of unexplained cases has decreased rapidly towards the vanishing point.

Therefore, on the basis of this evaluation of the information, it is considered to be highly improbable that reports of unidentified aerial objects examined in this study represent observations of technological developments outside of the range of present-day scientific knowledge. It is emphasized that there has been a complete lack of any valid evidence of physical matter in any case of a reported unidentified aerial object.

E N D

DEPARTMENT OF THE AIR FORCE
Office of Public Information
Washington 25, D. C.

U. S. Air Force Summary of Events and Information
Concerning the Unidentified Flying Object Program

The Air Force feels a very definite obligation to identify and analyze things that happen in the air that may have in them menace to the United States and, because of that feeling of obligation and pursuit of that interest, the Air Force established an activity known as the Unidentified Flying Object Program.

This program was established in 1947 when unidentified flying objects were being reported in various parts of the United States. The reports of sightings reached a peak of 1,700 in 1952 and dropped to a total of 429 in 1953.

From a survey of the volume of sightings received by the Air Force, it has been determined that over 80 percent are explainable as being known objects. Generally, sighted objects fall in the category of: balloons, aircraft, astronomical bodies, atmospheric reflections, and birds. All reports of unidentified flying objects result from either radar or visual sightings.

Explanations pertaining to sightings reported from military and civilian radar facilities are as follows:

1. Temperature inversion reflections can give a return on a radar scope that is as sharp as that received from an aircraft. Speeds of these returns reportedly range from zero to fantastic rates. The "objects" also appear to move in all directions. Such sightings have resulted in many fruitless intercept efforts.

To possibly bear out the theory of temperature inversion reflection is an incident which occurred in January 1951 near Oakridge, Tennessee. Two Air Force aircraft attempted to intercept an unidentified "object" and actually established a radar "lock" on the object. Their altitude at the time was 7,000 feet. The unidentified object, according to their radar, appeared to be at an elevation of 10 to 25 degrees from this altitude. Three passes were made in an attempt to close on the object. In each instance the pilots reported that their radar led them first upward and then down toward a specific point on the ground. (One scientific theory holds that light can be similarly reflected from a layer of warm air above the earth. If this proves to be correct, many visual night sightings could be accounted for.)

2. Ionized clouds have caused some unidentified radar returns. Thunderstorms are identifiable by radar and radar returns have also been received from ice formations in the air, balloons, ground reflections, frequency interference between other radar stations, and windborn objects. Obviously, such returns are very difficult to identify, especially when they occur during darkness.

3. The radar screen has picked up birds and in one case a flock of ducks. Flight interceptions proved these phenomena.

An explanation of known types of visual sightings are as follows:

1. Present-day jet aircraft, flying at great speeds and high altitudes, are often mistaken for unknown objects by the untrained observer. Sunlight reflections from the polished surfaces aircraft can be seen plainly even when the aircraft itself is too distant to be visible. The exhaust of jet aircraft emits a trail and often this is seen rather than the aircraft itself.

2. Weather balloons account for a substantial number of sightings. These balloons, sent to altitudes of 40,000 feet and higher, are launched from virtually every airfield in the country. They are made of rubber or polyethylene, swell as they gain altitude, have very good reflective qualities, carry small lights when launched after dark, and can be seen at very high altitudes.

3. In addition to the ordinary weather balloon, huge 90-foot balloons, which sometimes drift from coast to coast, are used for upper air research. These balloons also have a highly reflective surface and are visible at extreme altitudes.

4. Frequently, unusually bright meteors and planets will cause a flurry of reports, sometimes from relatively experienced observers. At certain times of the year, Venus, for instance, is low on the horizon and will appear to change color and move erratically due to hazy atmospheric conditions. Since the stars are charted and most of their characteristics known, many cases are traced to them. Meteors on the other hand are of rapid single-direction movement and are only visible for a few seconds. Meteor activity is more common at certain times of the year than others, and reports of UFO's have shown a tendency to increase during these periods.

5. Some cases arise which, on the basis of information received, are of a weird and peculiar nature. The objects display erratic movements and phenomenal speeds. Since maneuvers and speeds of this kind cannot be traced directly to aircraft, balloons, or known astronomical sources, it is believed that they are reflections from objects rather than being objects themselves. For example: suppose we would hold a mirror in hand under a light, causing a reflection on the ceiling. Only a slight, quick movement of the hand would result in erratic movements and phenomenal speeds of the reflected beam. Reflections may be projected to clouds and haze both from the ground and air. Many things which are common to the sky have highly reflective qualities, such as balloons, aircraft, and clouds. Accurate speeds are also difficult to determine due to the inability of the reporter to judge distance, angles, and time.

6. Brilliant flashing lights that sometimes appear red and white in color have been reported by observers. This type has been traced to a new lighting system of commercial airlines and military aircraft. Atop the tail section of these aircraft highly reflective red and white flasher type lights have been installed and are many times misinterpreted by the ground observer.

In the analysis and investigation of the radar and visual sightings described, there are some yardsticks which have been established from experience and trends to measure and attempt to determine the source of UFO's. Some of these are general in nature and are subject to change as new scientific and factual information is received. It should be remembered that any object viewed from a great distance appears to be round. Nearly all the sightings reported are described as round and would tend to indicate that most of the objects are at a greater distance from the observer than is generally estimated.

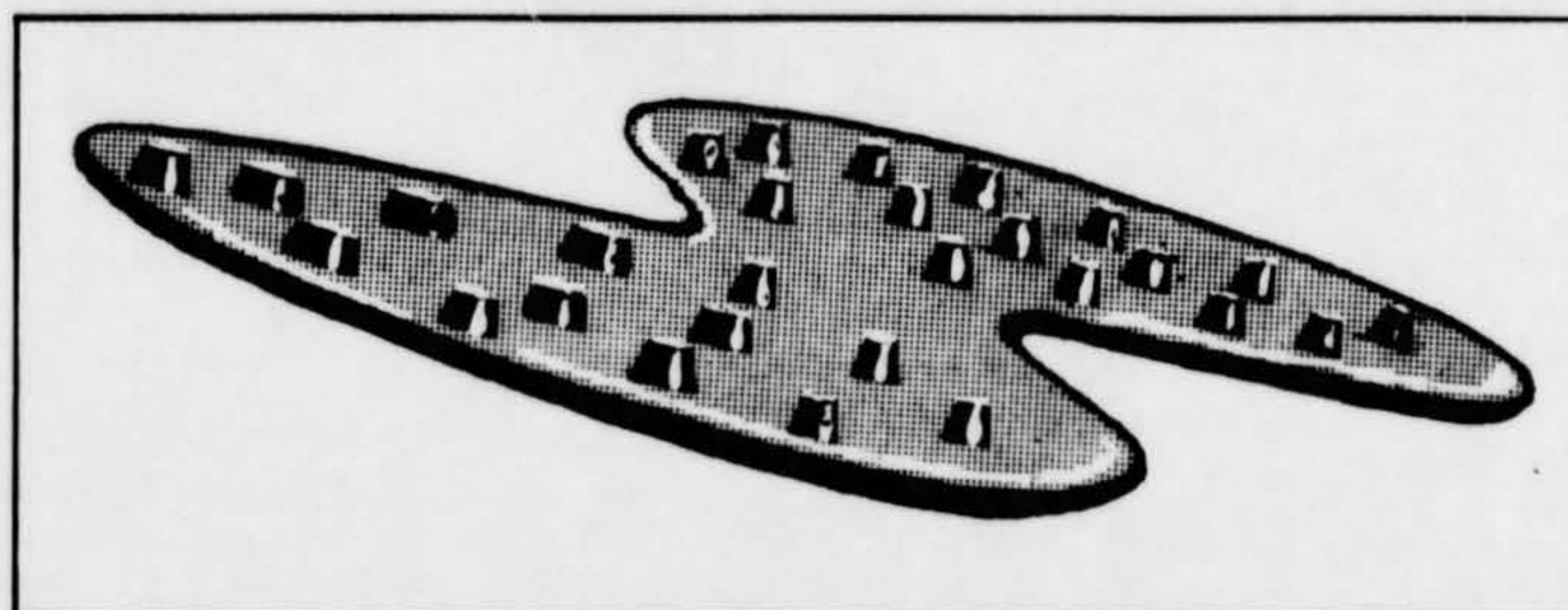
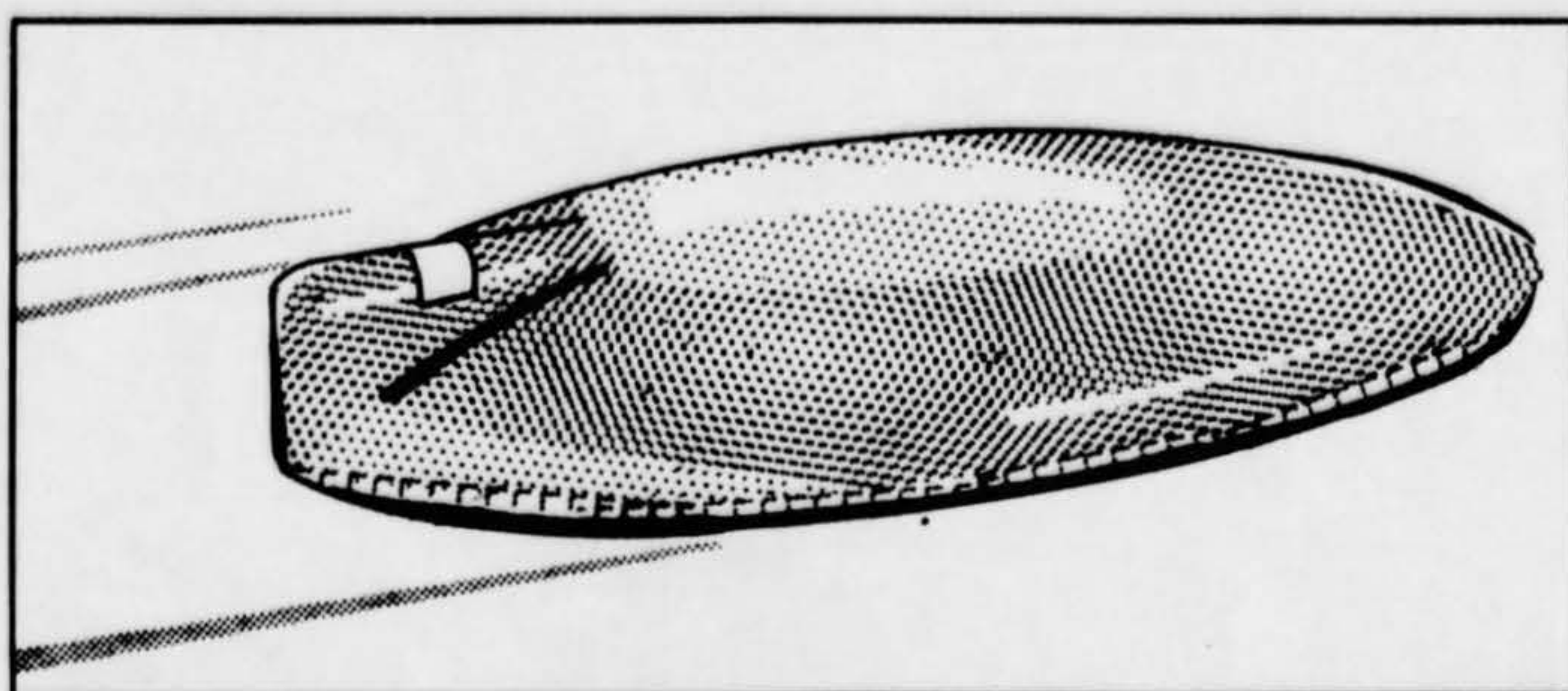
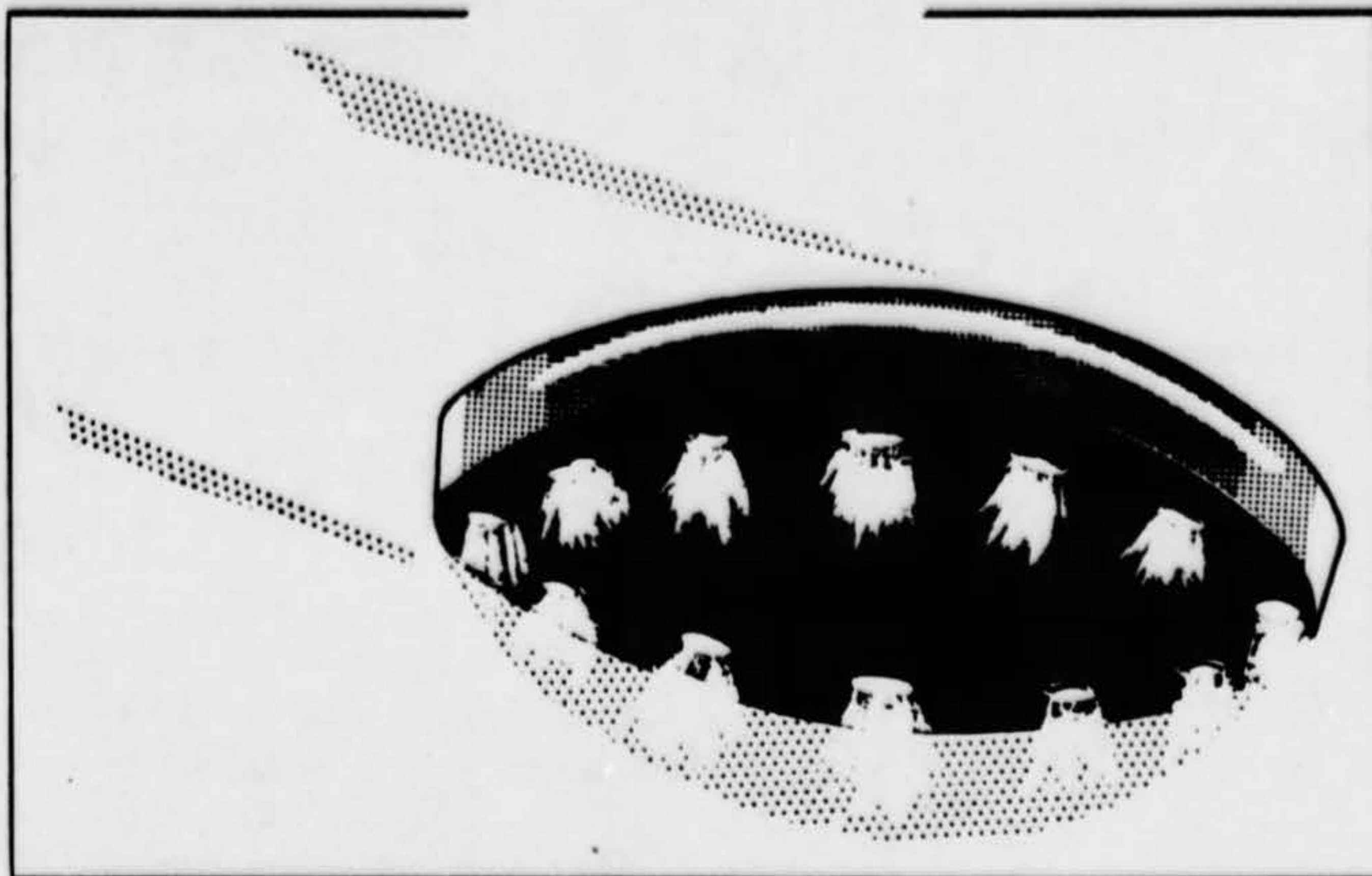
Another misconception centers about photographs of unidentified flying objects. At best the majority of photographs have proven non-conclusive as evidence to this program mainly due to type cameras used. Also, it might be mentioned that because still photographs can be so easily faked, either by using a mock-up or model against a legitimate background, or by retouching the negative, they are worthless as evidence. Innumerable objects, from ashtrays to wash basins, have been photographed while sailing through the air. Many such photos have been published without revealing the true identity of the objects.

More attention is given to moving pictures of unidentified flying objects since they are more difficult to retouch. However, only a very few movie-type films have been received by the Air Force and they reveal only pinpoints of light moving across the sky. The Air Force has been unable to identify the source of these lights because the images are too small to analyze properly. Since ownership of these films remains with the persons taking them, the Air Force is not in a position to give them out.

The difficulty of evaluating reports of all types is based largely upon the lack of basic data surrounding the sightings. The drop in sightings during 1953 is largely due to the increased accuracy and the completeness of reports being received. To be of value, a report should include such basic data as size, shape, composition, speed, altitude, direction, and the maneuver pattern of the objects. Without such information, it is almost impossible to establish the identity of the object sighted. In addition, a recent study has shown a direct correlation between the number of sightings reported and the publicity given to "saucers" by the nation's press.

The Air Force took a further step in early 1953 by procuring Vidicon cameras for the purpose of photographing this phenomenon. These cameras were distributed to various military installations. This type camera has two lenses, one of which takes an ordinary photograph, and the other has a diffraction grating which separates light into its component parts. This aids in determining the composition of the object photographed. A small number of photographs have been received from this camera; however, only light spots of no detail have been indicated in the photos to date. As more photographs are taken by these observers, it is believed that a great deal of the mystery will be lifted from the program.

The Air Force would like to state that no evidence has been received which would tend to indicate that the United States is being observed by machines from outer space or a foreign government. No object or particle of an unknown substance has been received and no photographs of detail have been produced. The photographs on hand are, at best, only large and small blobs of light which, in most cases, are explainable.



It may be concluded from the above and from past experience that no new significant trends have developed out of these cases. There was an increase in public interest which occurred simultaneously with the publication of various books and articles on the subject; however, this trend has been noted several times previously.

In order to overcome the lack of basic data, and to standardize all reports, a detailed questionnaire is now submitted to each person reporting an unidentified aerial object. It is felt that the information thus obtained will lower still more the number of unexplained sightings.

For observers who wish to report unidentified aerial objects, the Air Force would welcome the information. Attached to this report is a brief basic summary form. It would be appreciated if observers would send the completed form to the nearest Air Force base.

If and when new developments turn up in this program, the Air Force will keep the public informed.

PLEASE SEND TO YOUR NEAREST AIR FORCE BASE

DATE: _____

TIME OF SIGHTING: _____

SIZE: _____

SHAPE: _____

COMPOSITION: _____

SPEED: _____

ALTITUDE: _____

DIRECTION OF TRAVEL: _____

MANEUVER PATTERN: _____

COLOR: _____

SOUND: _____

LENGTH OF TIME OBSERVED: _____

SKY CONDITIONS: _____

VISIBILITY: _____

GROUND DIRECTION OF WIND: _____

NAME, AGE, MAILING ADDRESS OF OBSERVER: _____

REMARKS: (General description of what you saw) (use back if necessary)

MEMO ROUTING SLIP

NEVER USE FOR APPROVALS, DISAPPROVALS,
CONCURRENCES, OR SIMILAR ACTIONS

1 NAME OR TITLE <i>Dr. Miley</i>	INITIALS		CIRCULATE
ORGANIZATION AND LOCATION <i>4E4</i>	DATE		COORDINATION
2 <i>Col. Gilbert</i>			FILE
<i>4E</i>			INFORMATION
3			NECESSARY ACTION
			NOTE AND RETURN
4			SEE ME
			SIGNATURE

REMARKS

1. Under the circumstances (3 days to prepare a training course on UFOs), I believe this draft will fulfill the general requirements.
2. Beside techniques and guides to investigation and identification, background, so-called UFO clubs and self-appointed flying saucers were also covered.
3. Liberal visual aids and hand-out material, as in this case, a must. will

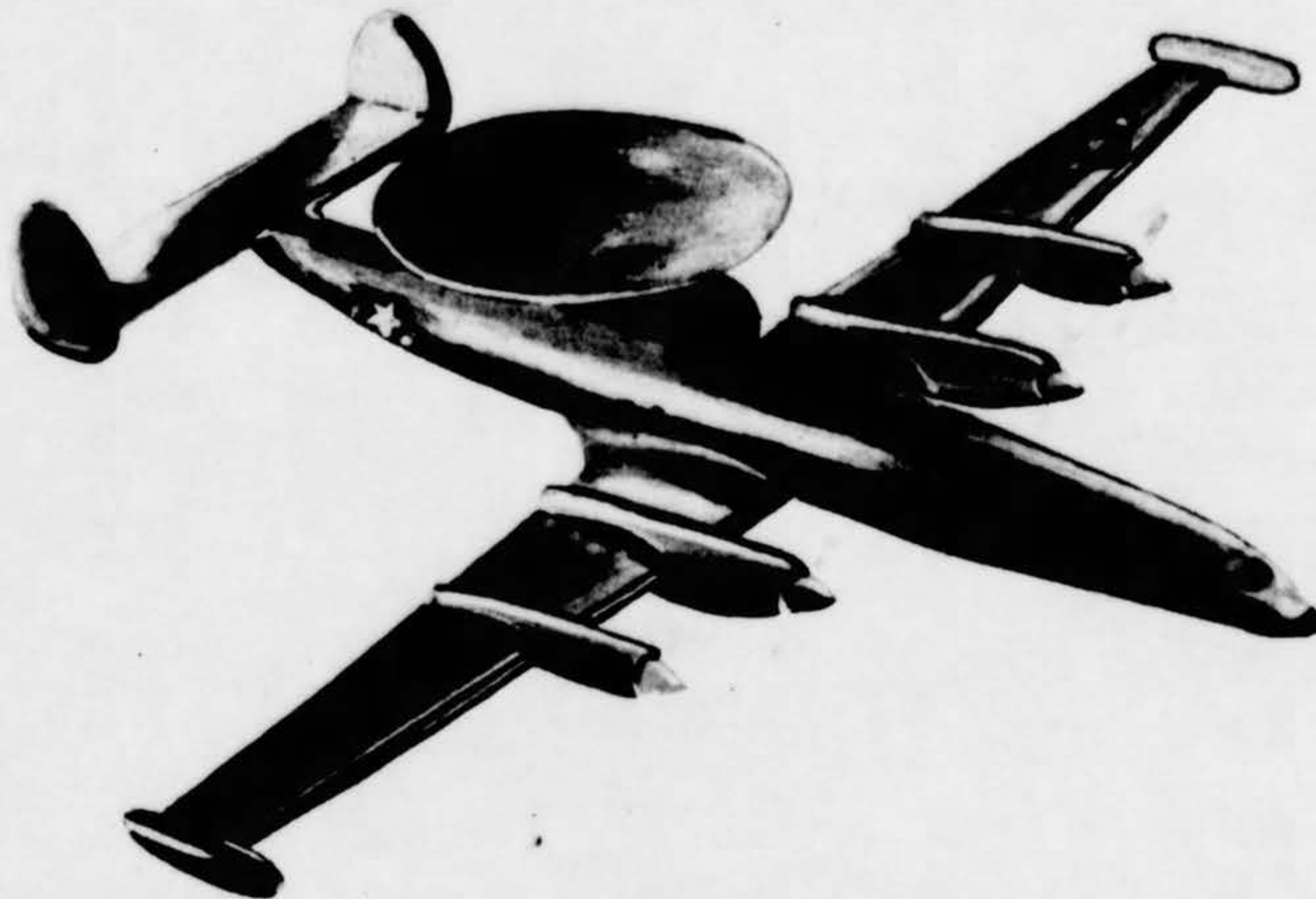
FROM NAME OR TITLE <i>Capt. Gregory</i>	DATE <i>Revise</i>
ORGANIZATION AND LOCATION <i>Project Officer - UFO</i>	TELEPHONE

NEW FLYING OBJECTS

A new saucer-domed radar plane, now in the planning stage, is an example of an unfamiliar type of aircraft which, to the uninitiated observer, might appear to fall into the unidentified flying object category.

Technical advancements in the field of supersonic rockets to gather weather data offer possibilities for radar detection of apparently unidentified flying objects. Rockets will be shot into the stratosphere at 3000-plus miles per hour. At a height of 20 miles or more, their warheads will explode and release a cloud of metal foil fragments, which will be tracked by radar to learn wind velocity and direction.

The construction and successful launching of man-made satellites into the edge of space above the earth as part of the International Geophysical Year program, which began on 1 July 1957, may lead to reports of unidentified flying objects. The United States expects to launch a scientific data-gathering satellite in 1958 at the latest. At least one other country has announced intentions of duplicating this feat.



This new radar plane may easily be mistaken for an unfamiliar flying object, under unusual weather conditions, because of its unique configuration.



New USAF delta-wing jet bomber shows unusual configuration.

The satellite developed by United States scientists is a highly-polished, 20-inch sphere to be propelled aloft by a three-stage rocket. Its planned orbit is at a height of about 300 miles and is in the direction of the earth's rotation. Its course will follow a path that will permit its sighting from positions in Europe, North Africa and the Middle East. Although the satellite's size will appear minute at such an extreme altitude, its reflection will be visible to the naked eye under certain weather conditions. Its terrific speed will carry it from one horizon to the other, within the view of an observer, in less than 20 minutes.

Many new types of delta-wing aircraft are under development and some are in production at this time. Certain types are capable of vertical take-off. The unusual configuration of this aircraft lends itself to possible confusion with unidentified flying objects, and a vertical take-off might add to the observer's failure to identify it as a known object.

* * * * *

Analysis thus far has failed to provide a satisfactory explanation for a number of unidentified flying objects. An understanding of some of the phenomena which may cause familiar objects to assume unfamiliar characteristics, together with an awareness of the many new technological developments which may be observed, should result in fewer sightings of this nature. Rational reporting will facilitate analysis of those sightings reported as unidentifiable.

SECTION II

Meteorological and Astronomical Aspects

Scientists have been exploring the mysteries of the universe for many centuries and today know a great deal about the composition of the galaxy which includes the earth among its many planets, stars, and other celestial bodies. Yet, many questions remain unanswered and the search for more knowledge in the broad field of astronomy continues. The same is true regarding the earth's atmosphere, and, although considerably more is known regarding the natural laws which govern the sea of air around the earth, there are many aspects of meteorology that are not yet fully understood.

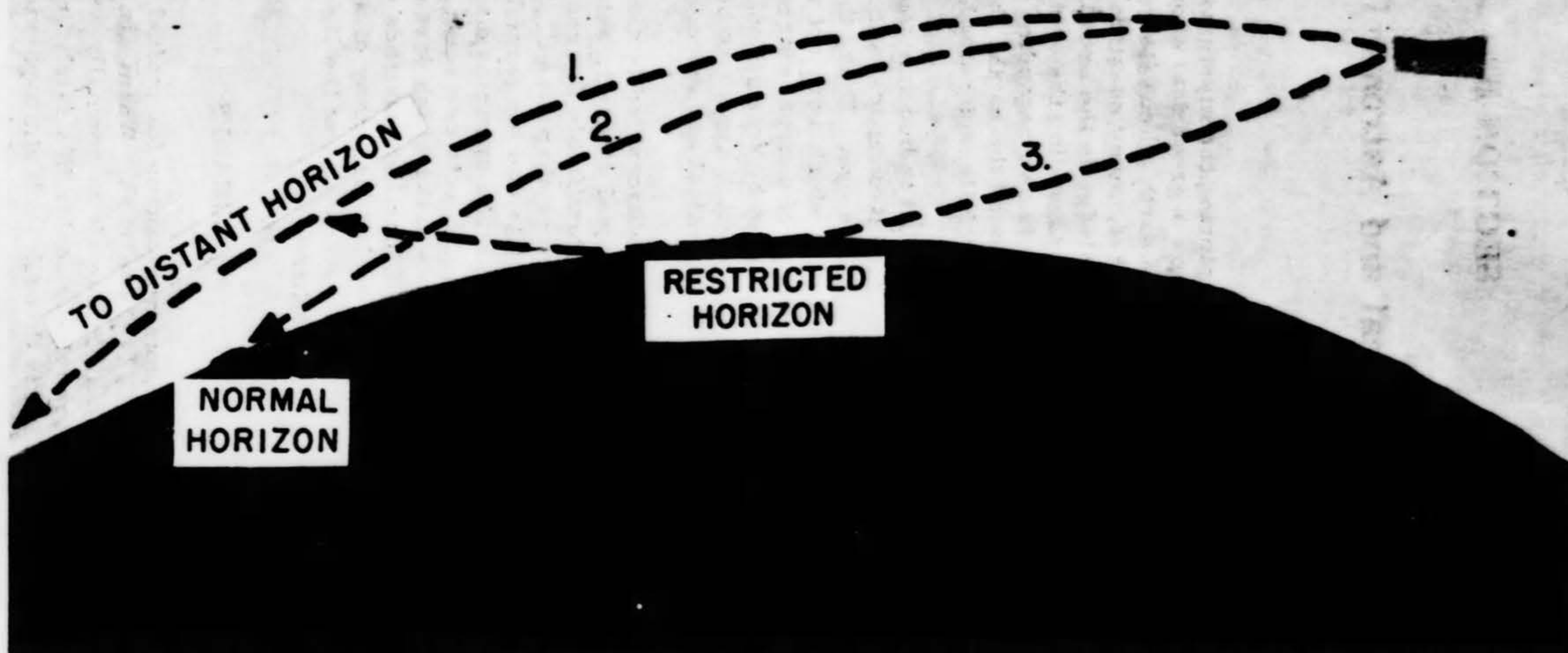
It is not unusual for the mind to become confused by garbled messages, caused by unusual astronomical and meteorological conditions and transmitted to it by the eye. Thus, the sky has been the setting for many strange sights which were not readily understood. Many may have been the result of unusual astronomical and meteorological conditions, which cannot be scientifically explained. However, many types of illusions which appear to be flying objects can definitely be related to astronomical and meteorological phenomena.

Under certain weather conditions, reflection and refraction processes can transform conventional aircraft, automobile lights, planets, meteors, and other identifiable figures into apparently supersonic flying objects of many shapes and colors. Clouds, haze, industrial smoke, water droplets and ice particles in the atmosphere are typical ingredients which make up atmospheric lenses through which many illusions of flying objects are seen. Car lights reflecting on clouds can create luminous disks which dart erratically through the sky at terrific speeds. Other light sources can produce similar illusions with appropriate variations, many of which even have specific colors provided by refraction of the light through water and ice particles in the atmosphere.

MIRAGES

One of the most common causes for optical illusions of distorted and displaced objects is the mirage. Warm air has a lower refractive index than cold air. The air is normally warmer at the surface of the earth and progressively cooler in a fairly steady gradient through higher altitudes. It is through such atmospheric conditions that distant objects are usually viewed and the mind becomes accustomed

1. Caused by Temperature Inversion
2. Normal Conditions
3. Caused by Extremely Warm Surface Air



to the impressions conveyed to it through the eye in this normal perspective. Light rays normally travel in a concave path that intersects with the horizon. When the normal temperature distribution is upset, the light rays bend accordingly and optical phenomena result. Causes of mirages follow two basic patterns:

(1) When the surface air is exceptionally warm, the air expands and becomes less dense, causing the convex path to shorten and, under extremely hot conditions, even to become concave.

(2) Under conditions of a temperature inversion, with a layer of warm air over cold air, the path of light rays will lengthen to parallel the earth's surface at greater distances.

These abnormal conditions cause mirages and the eye will see unfamiliar or displaced and distorted images, which the mind is not immediately capable of interpreting correctly. Realistically proportioned mountains, cities and seas may be projected high into the atmosphere. On the other hand, land areas may be distorted and appear as separate images floating in the sky, giving the impression of suspended or flying objects. From an aircraft in flight, a cigar-shaped illusion of a land mass can change size drastically with changes of only a few feet in altitude of the observer's aircraft, thereby giving the illusion that the object is accelerating rapidly, traveling alternately at slow and extreme speeds, going away from the observer or coming toward him. The same is true at night in the case of objects formed by such light sources as search-lights, glow of lights from cities, automobile headlights, and celestial bodies. A temperature inversion can reflect the image of an aircraft to another location in the sky and mirror it as two aircraft, perfectly joined, with one aircraft inverted below the other.

The common mirage, based primarily on temperature distribution, is of course only one type of the numerous meteorological phenomena producing aerial apparitions. Others are caused by reflection and refraction of light through various atmospheric structures, such as different types of clouds, water droplets, ice and frost formations, haze, and smoke. Combinations of meteorological situations, and even combinations of meteorological and astronomical conditions, can produce startling effects.

REFLECTIONAL DISPERSION

Combined refraction and dispersion of the earth's atmosphere can cause a celestial body to appear to be at a different location in space and distort its normal color as well. When the object is low on the horizon, this condition is particularly prevalent. The planet Venus, for instance, may appear as bright red on the bottom and bright blue at the top edge, thereby giving the illusion of a flying



This snow-capped mountain, viewed from an aircraft, is actually a mirage, as described by a pilot who experienced the phenomenon. Under other type mirage conditions, land masses may appear as cigar-shaped flying objects.

object emitting red exhaust trails. An observer flying in an aircraft may easily mistake such an apparition for a flying object. As the aircraft moves through the atmosphere at an advanced speed, its position relative to the object naturally changes and the atmospheric conditions in line of sight between the aircraft's position and the object may change as well. The object thus may assume apparent characteristics of erratic behavior and fantastic shapes and colors.

PLANETS

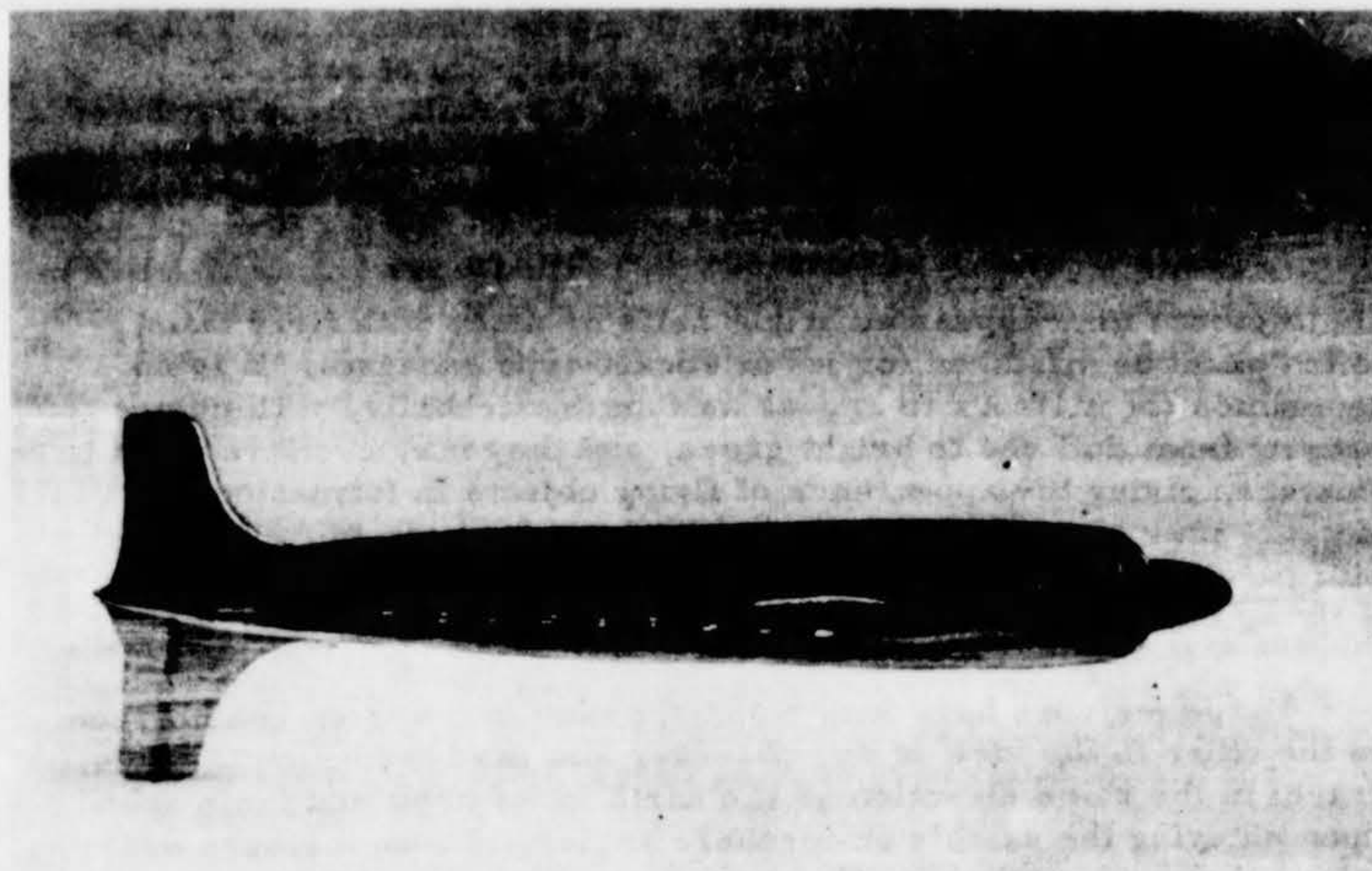
Although there are other planets that may resemble flying objects under certain conditions, Venus and Mars are most commonly mistaken in this sense. Venus is the brightest of all the planets and Mars is next. Venus, at its brightest, can be seen in daylight and can cast shadows after dark. This planet is a morning star from January to April, and an evening star during the remainder of the year. Mars is an evening star from January to September and a morning star the rest of the year.

In the past, both Venus and Mars, when low on the horizon, have been observed to change color and move at fantastic speeds, when viewed through haze or mist. Venus appears low on the horizon during the spring and is unusually bright. Mars has been reported to resemble a flying object when it was low on the horizon in early summer. If one of these planets is stared at for any length of time without any balancing point of reference, it can appear to perform erratic maneuvers. Thus, the planets of brighter magnitude in our galaxy provide a constant source of illusionary flying objects.

COMETS

Comets and meteors have their effect in the field of mistakenly-identified flying objects, although sightings of comets are rare simply because their incidence is so low.

Comets are nebulous bodies revolving around the sun for the most part in long ellipses. Although their periods are very uncertain, some few such as Halley's Comet, which pursues unmistakable ellipses, can be expected to return. The nucleus of a comet, a minute disk of condensed light, strengthens in brilliance the nearer its orbit brings it to the earth. Some comets become bright enough to be discerned even in daylight. Since the long tail of the typical comet is composed of matter repelled away from the sun, it may either follow or precede the head, depending on whether it is approaching or going away from the sun.



Under certain atmospheric conditions, an aircraft, such as the C-118 portrayed here, can appear to be mirrored in its own reflection. The fantasy of this phenomenon may be further exaggerated by distortion through haze or mist.

METEORS

Meteors are particles continually entering the earth's atmosphere where they become so intensely heated they turn into incandescent gas. Theories on the origin of meteors are largely controversial; however, educated guesses range from dissipated comets to disintegrated planets. It is estimated that 24,000,000 meteors, which can be observed by the naked eye, enter the earth's atmosphere during a 24-hour period. These space particles are of various sizes, ranging from the microscopic to the rare ones weighing tons.

Bright meteors are known as fireballs. The ones which penetrate the lower parts of the atmosphere, where they explode with a noise like distant thunder, are called bolides. These are rare--probably no more than a few dozen appear over Europe during an average year. When a meteor, of such size that it is not entirely consumed by frictional heat after it enters the atmosphere, eventually collides with the earth's surface, it is called a meteorite. It is estimated that about 2,000 of these latter enter the earth's atmosphere during an average year.

The appearance and behavior of meteors streaking through the earth's atmosphere take on various fantastic forms, depending upon their size and composition and the meteorological conditions through which they are viewed. A meteor with the brilliance of the Pole Star can be caused by a particle no larger than a grain of sand. A particle no bigger than a pea can become a fireball. Examination of discovered meteorites reveals that most are irregular in shape; however, many become conically shaped in their passage through the earth's dense atmosphere.

Meteors may appear as bright balls or disks with fiery tails, which could be mistaken for jet or rocket-type exhausts. It is not uncommon for meteors to appear as flaming fireballs, with colors ranging from dull red to bright green, and they may even travel in clusters, giving the appearance of flying objects in formation. Meteors may also move relatively slowly and appear to follow a path parallel to the horizon, thereby giving strength to the illusion of flying objects.

Large meteors have long paths and may cross from one horizon to the other in the view of one observer and pass far beyond. They travel in the same direction as the earth in its orbit and their speed upon entering the earth's atmosphere varies. Those meteors overtaking the earth during evening hours may travel initially as slowly as seven miles per second, while those meeting the earth's rotation head-on during morning hours can be traveling more than 40 miles per second. Multiply these types of appearances and behaviors by complementary meteorological phenomena and the prospects for illusionary flying objects are considerably increased.

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Aids to Identification of Flying Objects

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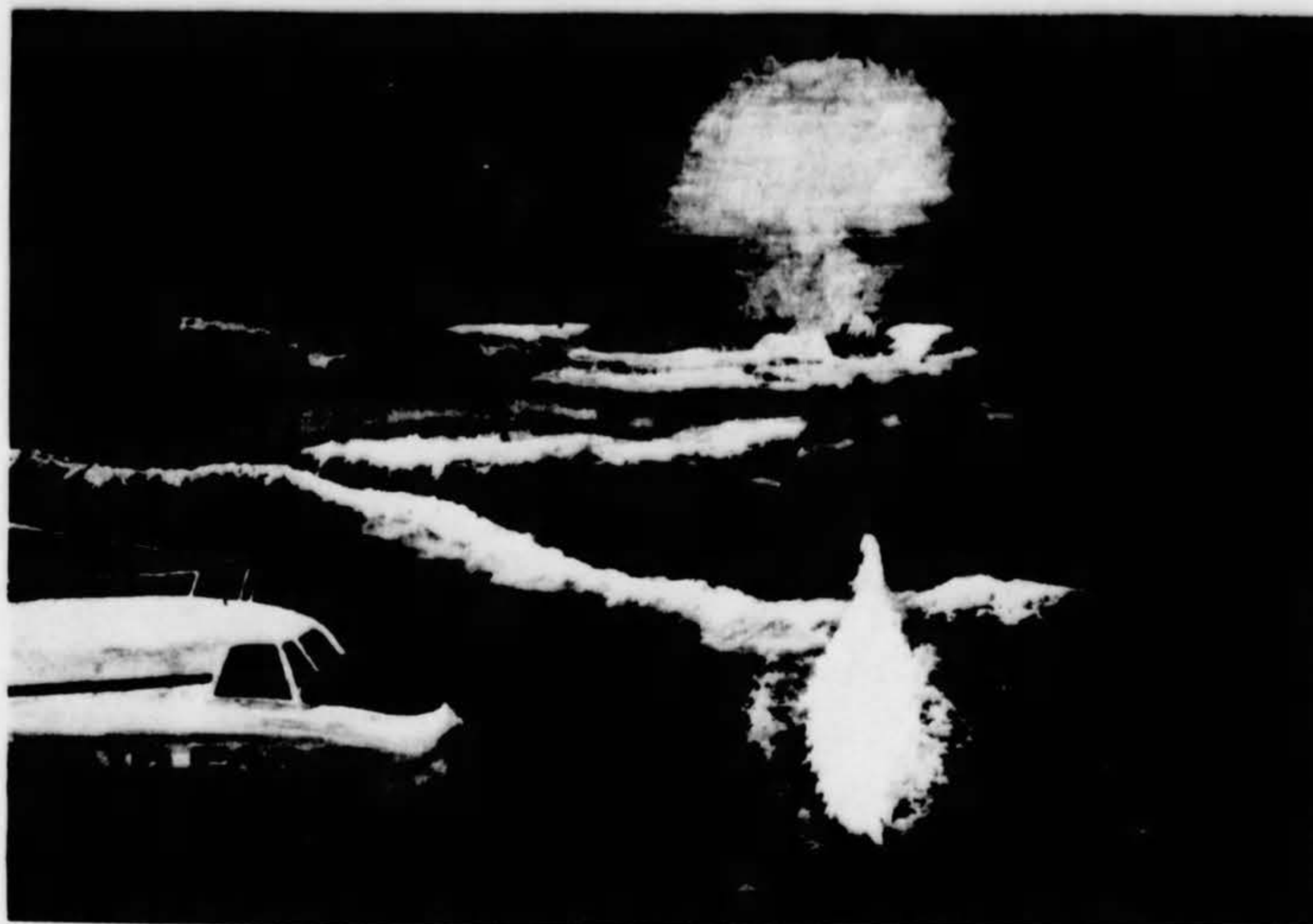
Artist's concept of actual meteor procession.

SUNDOGS AND MOONDOGS

The reflection of the sun in a layer of flat ice crystals can cause a phenomenon known as a sub-sun, commonly called a sundog. This apparition will appear at a point adjacent to the real sun and can be as brilliant as the sun itself. The sub-sun can develop a pattern of other sub-suns, causing a further complicated illusion. At night, the moon will reflect in the same manner under like meteorological conditions. This type of apparition is particularly discernible from aircraft at high altitudes.

The size and brilliance of sundogs and moondogs, and their behavior in relation to the observer's aircraft, will depend upon the location and density of the reflecting source, i.e., ice or frost-crystal formations, and, of course, upon the position and movement of the aircraft. The sundog or moondog may appear to chase the aircraft or fly in formation with it. If the aircraft turns toward the illusion, it may appear to slow down, speed up, and even come toward the aircraft head-on.

Cirrus cloud formations are effective viewing screens for illusions resulting from reflected or refracted light, as they contain ice crystals. These clouds exist in the upper atmosphere, so that conditions are favorable throughout the year for sundog and moondog apparitions. However, such phenomena usually are discernible at lower levels only during winter months in temperate zones.



A moon-dog might appear like this, viewed from an aircraft at two o'clock high from the one in the picture.

AURORAS

The aurora borealis, or northern lights, produces conditions and phenomena which have been associated with mistakenly-conceived flying objects. Auroral activity is associated with the earth's magnetic fields, explosions on the surface of the sun, and other solar activity. The auroral zone in the northern hemisphere follows roughly a circle around, and about 23 degrees away from the magnetic pole. In Europe, auroras are seen only infrequently below 50 degrees.

The aurora borealis cannot be seen in daylight, and during moonlit periods it is inconspicuous. It is sometimes bright enough to read by, and on rare occasions, its surface brightness surpasses even that of the moon. The most distinctive form of the aurora is that of a curtain or long wavy band, often with folds and flutings in it. Although the lower edge of the aurora is nearly horizontal, the band as seen from Europe would appear as an arc, due to its great distance from the observer. Auroras may consist of more than one curtain and may appear and disappear rapidly, remain constant for long periods, or move slowly across the sky. Some may appear merely as formless, diffused lighting in the sky. Faint auroras may appear colorless. Bright auroras are usually yellow-green, but other colors such as red, blue, grey and violet sometimes appear. A yellow-green curtain often will be tinged with red around its lower

edge. Auroras may appear high in the sky or low on the horizon, depending on the distance of the particular phenomenon from the observer.

While the chances of the aurora borealis itself being mistaken for a flying object are remote, the erratic lighting conditions it produces may often be a contributing factor to a sighting.

There are other phenomena believed to be associated with auroral activity which can produce apparitions resembling flying objects. Such phenomena occur during magnetic storms and probably are the result of gases emitted from explosions on the sun, and other solar activity. One such phenomenon, observed in northwest Europe, was described as a large brilliant disk which appeared on the east-northeast horizon and moved slowly across the sky, changing into an elongated ellipse, thence back to a disk before it disappeared below the opposite horizon.

This phenomenon was observed by many scientists who were out in force to observe expected auroral displays in connection with the magnetic storm they knew to be in progress. It is believed to have been caused by gases traveling through layers of the upper atmosphere in the auroral zone. Its color was described variously as white, pearly-white, greenish-white and yellowish-white. Calculations based on numerous observations of the phenomenon indicate that it may have been about 70 miles long by 10 miles in diameter.

This phenomenon occurred before the advent of the airplane and all observations were from the ground. However, a phenomenon of this size and brilliance could be seen for hundreds of miles from the air, and in myriad fantastic shapes and maneuvers if complemented by compatible atmospheric conditions. Official astronomical records reveal numerous equally fantastic illusions resulting from phenomena of this sort.

* * * * *

The composition and structure of the earth's atmosphere and the space which lies beyond, and the natural laws which govern them, are complex. The foregoing is not an attempt to relate all apparently unexplainable aerial phenomena to meteorological and astronomical causes. Rather, it is a summation of the more important aspects of meteorology and astronomy which contribute to sightings of illusionary and real flying objects that cannot be identified readily. The information is designed to orient the potential observer in meteorological and astronomical conditions which affect human perception, thereby enabling him to understand the implications involved and report his sightings more rationally and lucidly.

SECTION III

Radar Sightings

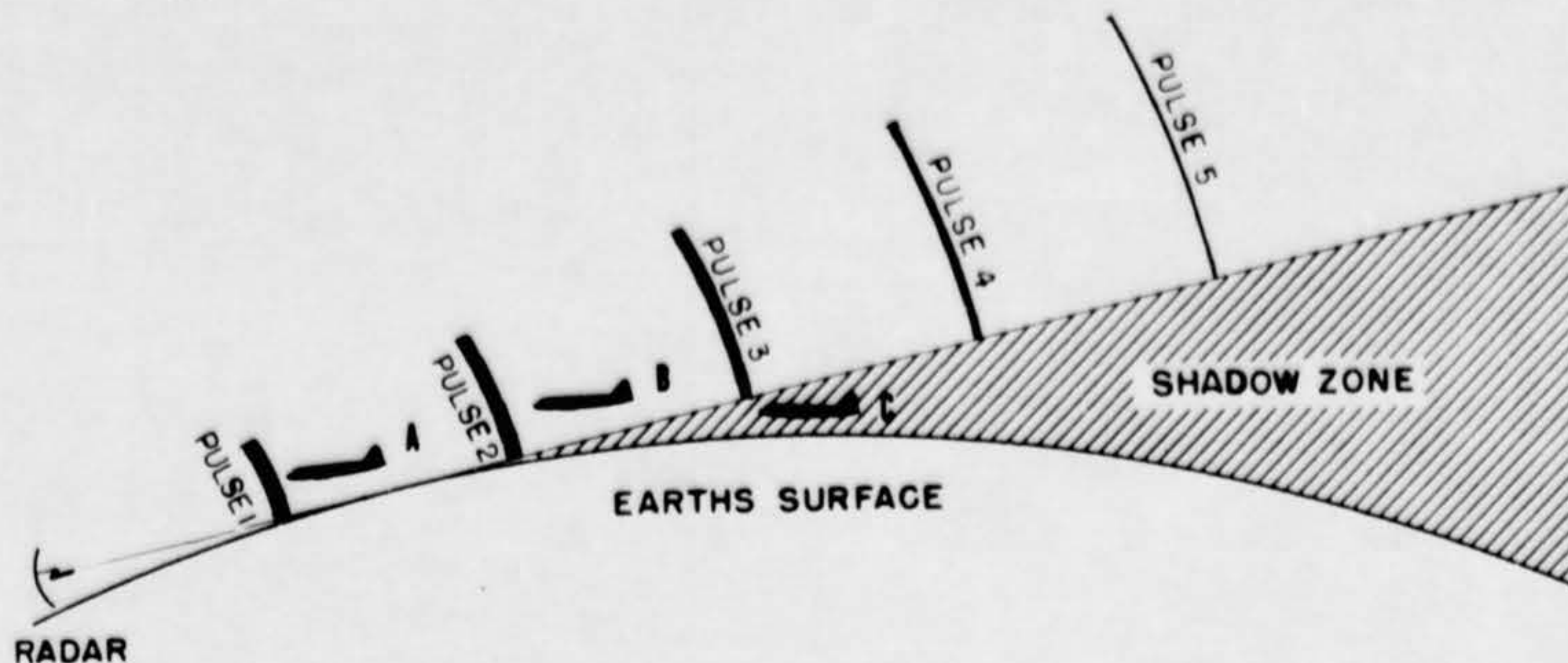
In certain instances, unidentified objects have been observed on radarscopes, both ground and airborne. Generally speaking these radar sightings fall into explainable patterns and are caused by certain meteorological phenomena, or familiar objects that are observed under unnatural circumstances

Radar echoes can be produced by a variety of objects, many of which are not visible to the human eye. A majority of solid objects which return radar energy produce responses on the radarscope that are easily recognizable. Moving objects, such as birds, aircraft and meteorological balloons, are normally recognizable by their size and velocity. However, some balloons, such as ionospheric balloons, ascend to altitudes above those of normal aircraft and travel with the upper air currents, sometimes at speeds above 100 mph. Radar returns from these balloons could give impressions of unidentified objects.

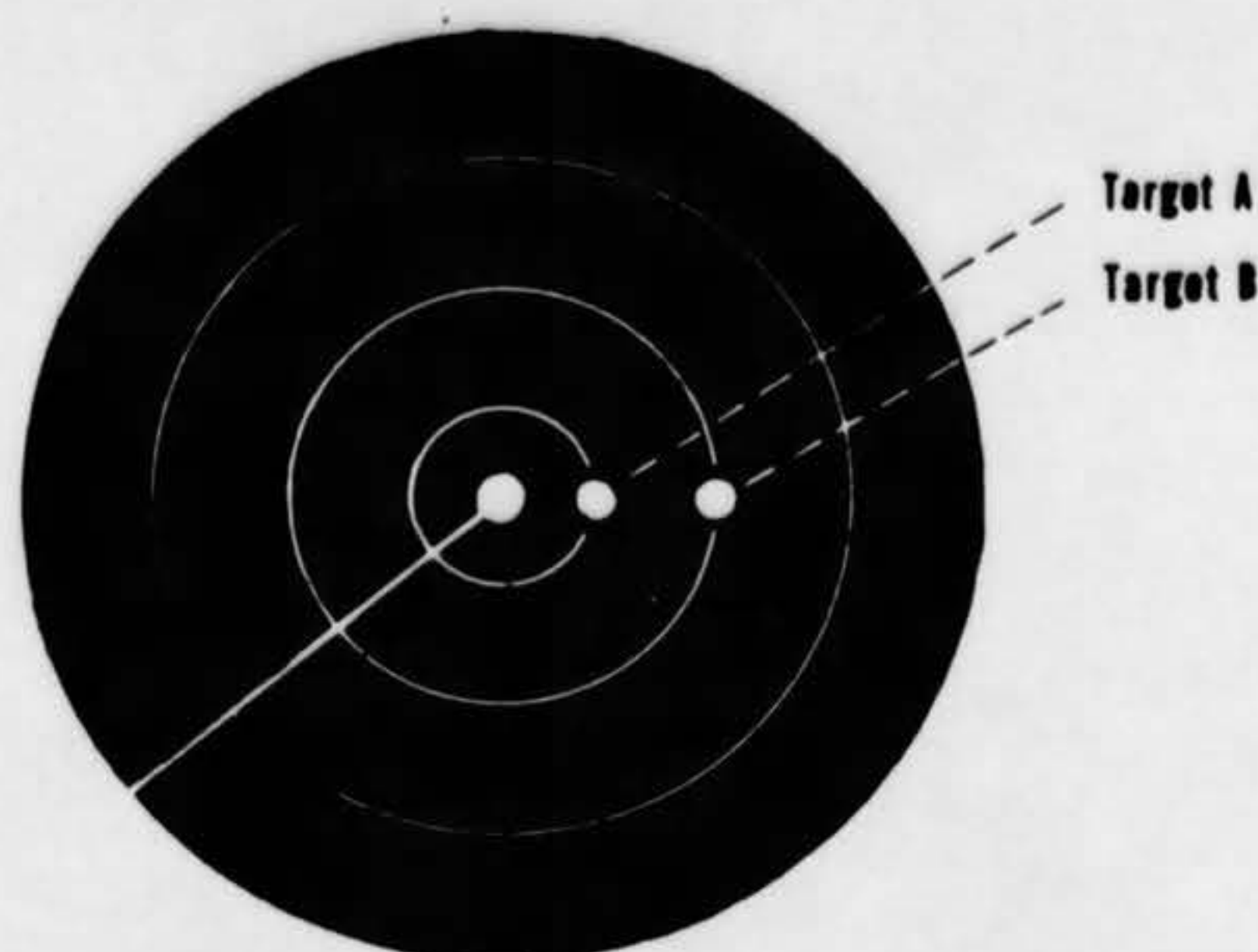
Certain meteorological and astronomical conditions will present radar returns that are unusual. Radar waves must travel through the earth's atmosphere where, like light waves, they may be bent by unusual temperature and moisture conditions. Radar waves may be refracted or reflected by atmospheric conditions to where ground objects may seem to represent an aircraft or flying object. Even with a moving target indicator, reflected images of distant ground objects may appear to be moving because of the movement of air layers.

Temperature inversions, in which a cold air mass is overlaid by a warmer air mass, can greatly increase the distance from which normal radar returns are received. Thus, objects may appear to be much closer than they actually are and these distant objects, superimposed on the normal radarscope picture, may result in misinterpretation and confusion.

Radar echoes may be produced by condensed water vapor in the form of raindrops, ice crystals, or snow. These radar reflections may cover a wide area which has diffused, irregular boundaries and fluctuating intensities. Movement of this water vapor will be determined by the movement of upper air currents, which travel at a speed of as much as 100 mph or more and at altitudes up to 40,000 feet. Normally, these patterns are easily recognizable by their size and radar return; however, they may appear confusing and result in false interpretations.



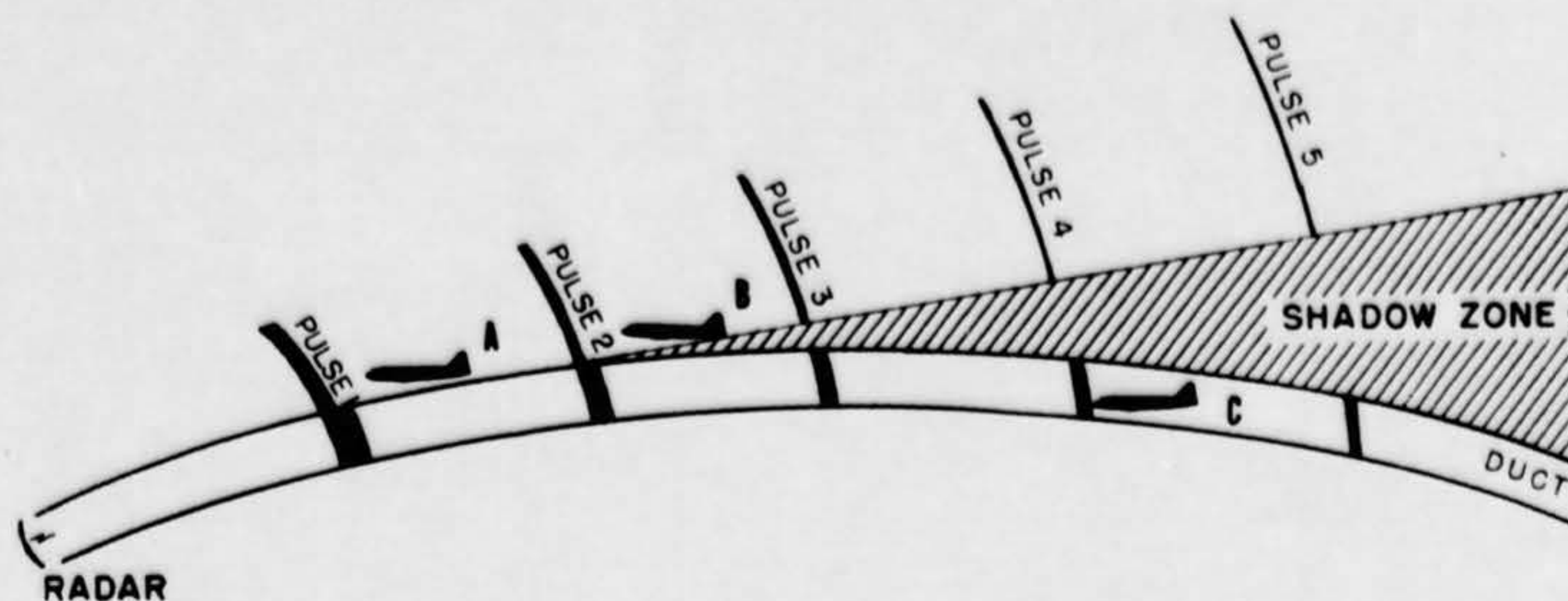
The transmission of a radar pulse, under normal atmospheric conditions, follows line of sight. Therefore the curvature of the earth would place Target "C" in the shadow zone.



The radarscope will show Targets "A" and "B" at normal range, but will not pick up Target "C".

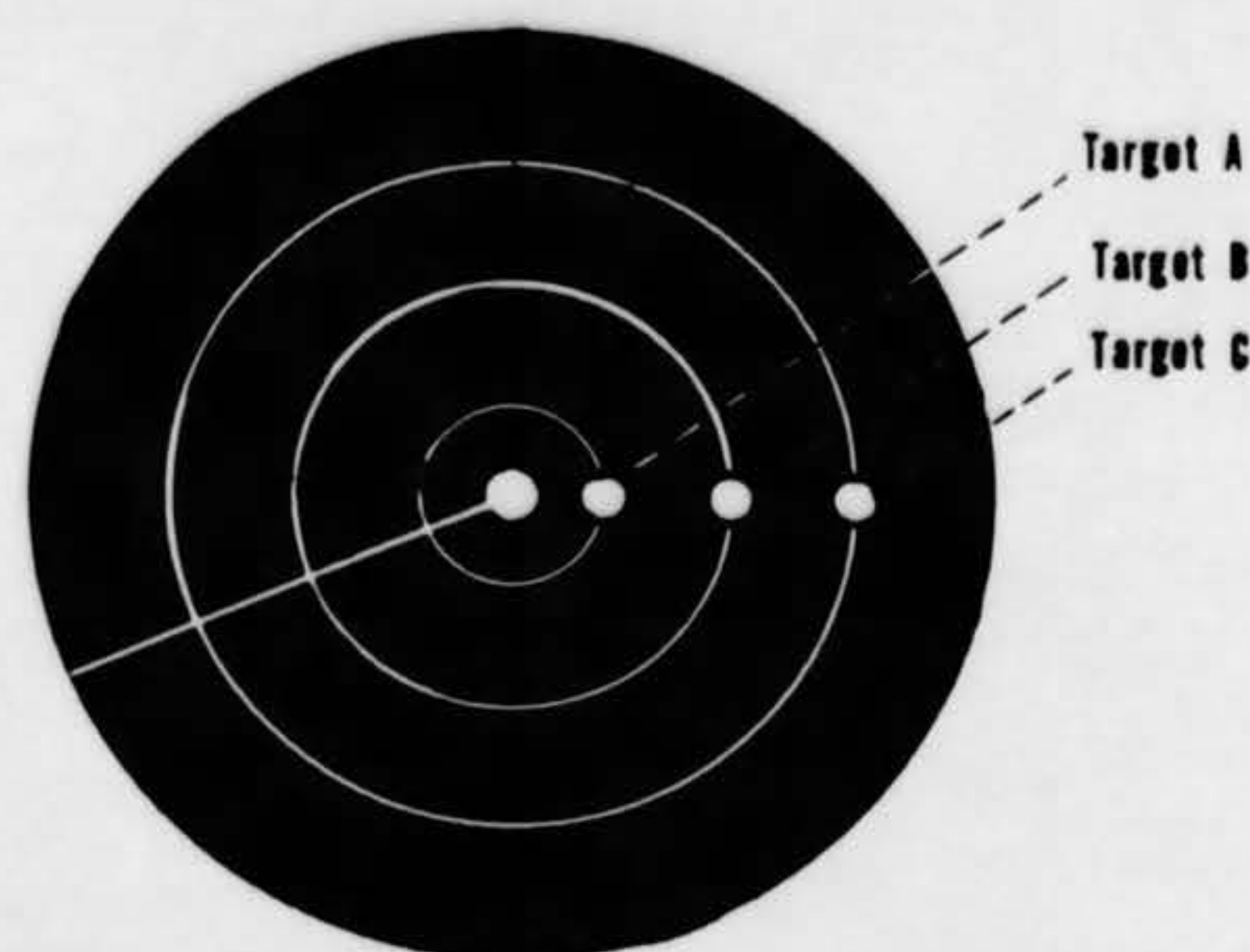
Meteors that enter the earth's atmosphere and get within range of radar may cause reflections that are extremely difficult to verify. Meteors reach the outer fringe of the earth's atmosphere at a rate of something near 100,000 miles per hour, although only a very few actually get within range of radar. Those that do, approach the earth from all angles and at velocities approaching 25,000 mph. Radar responses to these meteors may occur at any range or altitude, depending only upon the capabilities of the radar set. Radar reports resulting from this type of phenomenon can be verified by a study of the expected paths of meteors at the time of the incident.

In addition, there is the possibility that one radar set, which has characteristics similar to those of another radar set within range, may cause interference and unusual responses that could lead to confusion and inaccurate interpretation. Although this type of inter-



Under abnormal conditions, with cool air overlaid by a warmer air mass, a duct is formed through which the radar pulse travels and reflects Target "C" at a much greater distance.

The radarscope will show Targets "A" and "B" at normal range, but distant Target "C" will appear to be at much closer range than it actually is.



ference may cause the appearance of one or even two targets on the radar screen, it can generally be recognized quite easily.

* * * * *

A careful study of unusual radar sightings will almost always disclose that the reason is explainable. Experience in the operation of radar will provide the operator with the ability to recognize most unusual phenomena when they occur. However, occasionally a verification of meteorological or astronomical data may be necessary to substantiate the validity of what otherwise might be considered an unfamiliar flying object.

SECTION IV

Physiological Aspects

Physiological factors may have profound effects upon an individual's ability to observe and to interpret observations accurately. One of the greatest hindrances to human understanding can result from deception of the senses. The sense of sight is, by itself, purely a physical process and the perception and understanding attached to visual sightings is determined largely by memory of past experiences and familiarity with surrounding objects. This relation of experiences to the interpretation of visual sightings permits many errors.

This margin of error may be applicable particularly to aircrew members operating high-performance aircraft, under adverse or unusual weather conditions, under tension, and during periods of extreme fatigue.

The aircrew member is generally familiar with many of the unusual observations associated with meteorological and astronomical phenomena. However, many unusual observations are the result of certain physiological effects that may be unknown or unfamiliar.

Occasionally, objects that exist on the surface of the eye may be mistaken for distant objects. These objects take various forms. Tiny specks of dirt may appear as shimmering globules of light and, if a speck is illuminated by an outside light source, it may appear as a large, out-of-focus blob of light. If this speck is viewed against a dark sky or background, it may be quite spectacular. As this speck floats across the pupil of the eye, it will create the appearance of movement.

Many reported unidentified objects, described as flying saucers, glowing disks, shiny spots or a string of pearls, are nothing more than minute blood capillaries on the surface of the retina of the eye, or tiny corpuscles, which become visible under special conditions of illumination.

Another physiological phenomenon is that of after-image. A sudden flash of light affects the retina of the eye and causes a dark image to remain visible for some time after the light has been extinguished. Flashes of lightning, comets, or meteors will cause this effect and may be confused and interpreted as unidentified flying objects.

Hypoxia, resulting from lack of oxygen, has varying effects on the ability to react and to observe accurately. The effects of hypoxia may vary much in the same manner as those of alcoholic intoxication. Usually vision is affected, reactions are retarded, and observations are distorted. An oxygen mask leak may cause alternating stages of hypoxia and normalcy, with the individual often being unaware of these changes.

In a series of tests conducted at the USAF School of Aviation Medicine to determine the effects of fatigue, it was discovered that extreme fatigue may cause an individual to hallucinate, imagining that he sees a variety of unusual objects, and with a vividness to make them seem quite real. Fatigue, even in minor degrees, will slow down reaction time and reduce ability to observe and interpret observations.

Two phenomena that occur frequently are those of autohypnosis and autokinesis. In both of these reactions, a stationary light will assume apparent movement. In autohypnosis, this reaction is caused by continued attention to an external light source. Autokinesis is the result of observing a stationary light under circumstances in which relation to familiar objects is absent.

There is strong evidence that a great many visual problems, both physical and physiological, arise as a direct result of flight at high altitudes.

When flights are conducted at relatively low altitudes, the visibility of distant targets will be reduced by atmospheric haze. This is because light emanating from objects in space is gradually attenuated by absorption and by primary and secondary scattering along the pathway of sight.

Along with the variation of the contrast by atmospheric interference, there is a shift of the apparent contours. This has been disclosed by experiments performed at the USAF School of Aviation Medicine. From these studies, it was concluded that the apparent angular size and apparent distance of objects depend on the brightness reduction of the atmosphere. With increasing altitudes, the deviation of the apparent luminance from the actual luminance of an object in space will result in the object's appearing brighter than it actually is. This may result in false identification of a normally familiar object.

* * * * *

The physiological effects enumerated above are but a few of the manifestations resulting from known reactions. Many physiological effects resulting from high-performance flight are still in the category of unknowns. However, these factors greatly influence one's ability to understand and interpret sensory reactions. If recognized by the aircrew member, they may aid in identifying unfamiliar objects in flight.

SECTION V

Psychological Aspects

Reasoning ability, degree of susceptibility to suggestion, and general mental attitude are vital factors in identifying and reporting flying objects. Failure to note details accurately and a tendency to overdraw descriptions of sightings can result in failure to identify. An over-active imagination, coupled with physiological strain, can transform unfamiliar meteorological or astronomical phenomena and light aberrations into unidentified flying objects.

Perception and feeling are closely related and can have a marked effect upon understanding. Motivation in many instances determines how we interpret what we see, and expectancy can induce manifestations which are only indirectly related to actual physical phenomena or objects. The separation of what may be observed through the senses from what is known through thought or intuition is difficult, inasmuch as understanding is derived from a combination of both. However, an objective attitude, which permits assessment of observed characteristics, rather than suppositions or theories, will assist the observer in avoiding distorted descriptions.

It has been suggested that the world each of us knows is a world created in large measure from our experience in dealing with our environment. When two points of light, one brighter than the other, are placed at an equal distance from an observer in a dark room, the bright point of light looks nearer than the dim light, if one eye is closed and the observer remains motionless. The direction from the observer, as well as a difference in brightness, will result in an apparent variance in distance. Should two equally bright lights be placed near the floor, one about a foot above the other, the upper light will appear to be at a greater distance from the observer than the lower one. Conversely, when the lights are placed near the ceiling of the room, the lower light will appear to be farther away.

When two partly inflated balloons are illuminated indirectly and fastened in positions about one foot apart, where their relative brightness and inflation can be controlled, the observer will experience a variety of reactions as to what he saw.

If the brightness and size of the two balloons remain the same and the observer views them with one eye at a distance of approximately ten feet, he sees two bright spheres equidistant from his position. If the relative sizes are changed and the brightness remains the same, the larger balloon usually appears nearer. When

the size is changed continuously, the lighted balloons seem to move back and forth, giving the effect of erratic movement of lighted spheres through space. This is true even when observed with both eyes. If the relative brightness is varied constantly and the size remains the same, a similar effect is obtained. When there is a variation in relative size and brightness, most observers are inclined to judge distance by relative size rather than by relative brightness.

The effect of these tests upon the observer is premised on the fact that he draws upon past experience in assessing distance based upon relative size and brightness. He assumes that, since the two points of light appear similar, they are identical and of equal brightness. Therefore, the point of light which seems brighter must be nearer. In the case of the two points of light placed one above the other, past experience leads the observer to assume that, when he looks down, the lower light is nearer and, conversely, that, when he looks up, the higher light is nearer.

With regard to the seeming variance in distance when the size of objects is changed continuously, rarely has the observer seen two fixed objects at the same distance change in size. Usually any change in size of an object results from a change in the position of the object in relation to the position of the observer. As the object draws nearer, it becomes larger, and the reverse is true as it draws farther away. Therefore, in the case of the two balloons, the observer assumes that any change in size of the two balloons results from a variation in distance from his point of observation.

These experiments show how misinterpretations can result from the relation of visual perception to past experience in an effort to understand and recognize the object or objects seen.

When we see an object, we derive an impression not only of its location, but also of its existence as an object, and the location as related to visual perception will color the characteristics it possesses. Objects seen through haze or mist, or in reflected light, will assume characteristics they do not possess normally, but, because they have been perceived visually, the observer tends to accept them as real. Thus, psychologically, he creates an object with characteristics which do not exist in actuality. It is essential, therefore, that the observer analyze his observations in relation to unusual weather or lighting conditions and reject characteristics which deviate from the normal and can be explained by the unnatural conditions under which they were seen.

When we see an unfamiliar object, we draw upon our individual past experience in an attempt to identify it. If the unfamiliar characteristics of the object cannot be related to past experience, we have a feeling of uncertainty and it is then that we draw upon imagination in an effort to relate visual perception to understanding. Imagination is colored by suggestion and herein lies an inherent danger.

This handbook has been prepared by laymen in the hope that it will provide guidance in the identification of flying objects which cannot be identified. Comments and suggestions for improvement will be welcome.

We are open to suggestion constantly in our daily lives. Advertising media, artists' concepts, modern-day science fiction, propaganda, exaggerated film versions, publicity on perpetrated hoaxes, and the imaginings of zealots and fanatics all react upon the consciousness in the form of suggestion. When we seek an explanation for the unusual or unfamiliar, and attempt to draw upon imagination instead of rationalization, suggestion influences our thinking.

* * * * *

Physiological changes due to fatigue and intense strain enhance the susceptibility to suggestion and may induce psychological manifestations which a more rational state of mind would reject. The observer should attempt to evaluate his observations. Objective analysis of those characteristics he has observed, in relation to the conditions under which they were seen, will assist in identification of the unfamiliar object and result in more accurate reporting.

SECTION VI

Visual Perception

Since visual perception supplies the first awareness of a flying object, it is important to know "how to see." Knowing "how to see" will facilitate identification and reporting of flying objects. The following aids to "seeing" to the best advantage are provided from Air Force Manual 51-7, "Your Body in Flight."

SKY SEARCH

It is a common misconception that the eye "takes a picture" of everything within its field of view. This is not true. Pick out any word in this sentence and then move your eye to the next and then the next. You will discover that you can no longer read the first word after having moved your eye about 5 degrees.

You see best in daylight and the eye sees by moving in short jumps. It is not a sweeping but a jerking motion with which you see details around you. This is of the utmost importance to the combat pilot scanning the sky for the enemy. Experiments have shown that the eye sees nothing in detail while it is moving. It sees only when it pauses and fixes an object on its retina. In scanning the sky, do not deceive yourself that you have covered an area with a wide, sweeping glance. The correct way to scan is to cover an area with short, regularly-spaced movements of the eye. The scanning pattern followed depends, of course, on your position in the airplane.

DEPTH PERCEPTION

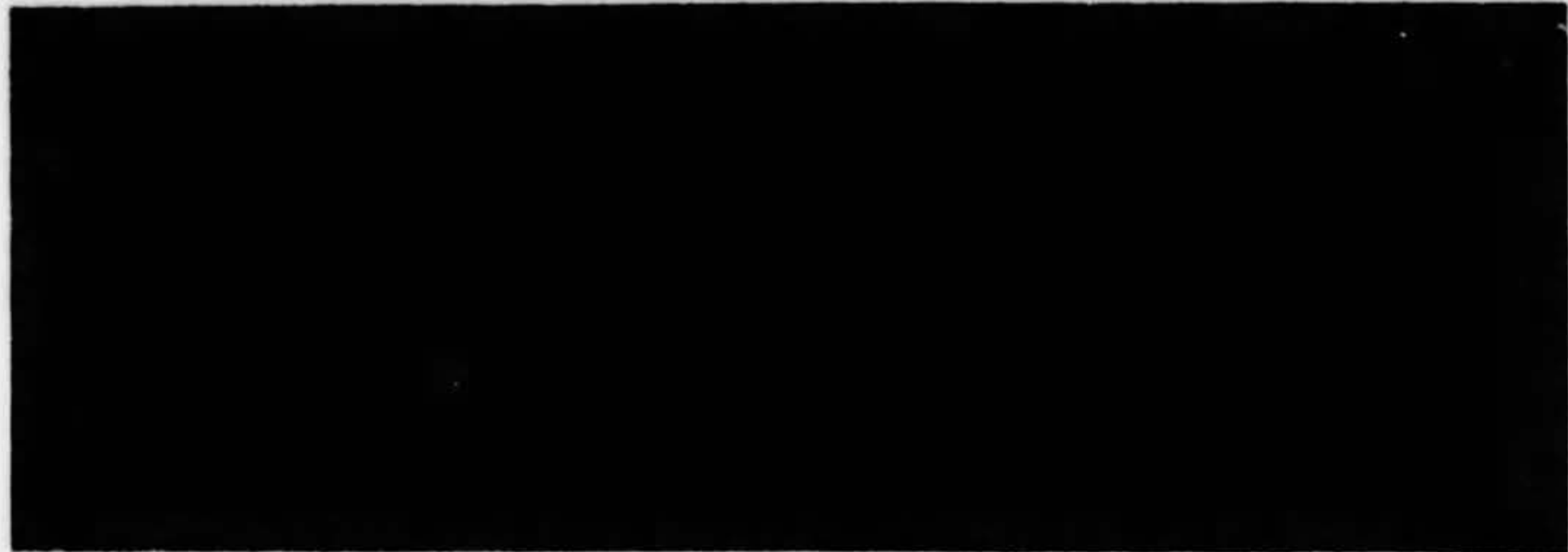
Judgment of distance is done subconsciously in a combination of ways: Close up, we depend on binocular vision, each eye seeing an object from a different angle. At distance beyond binocular range, which is usually the case in flight, we judge it on a one-eye basis. Examples of methods of depth perception follow:



Binocular vision



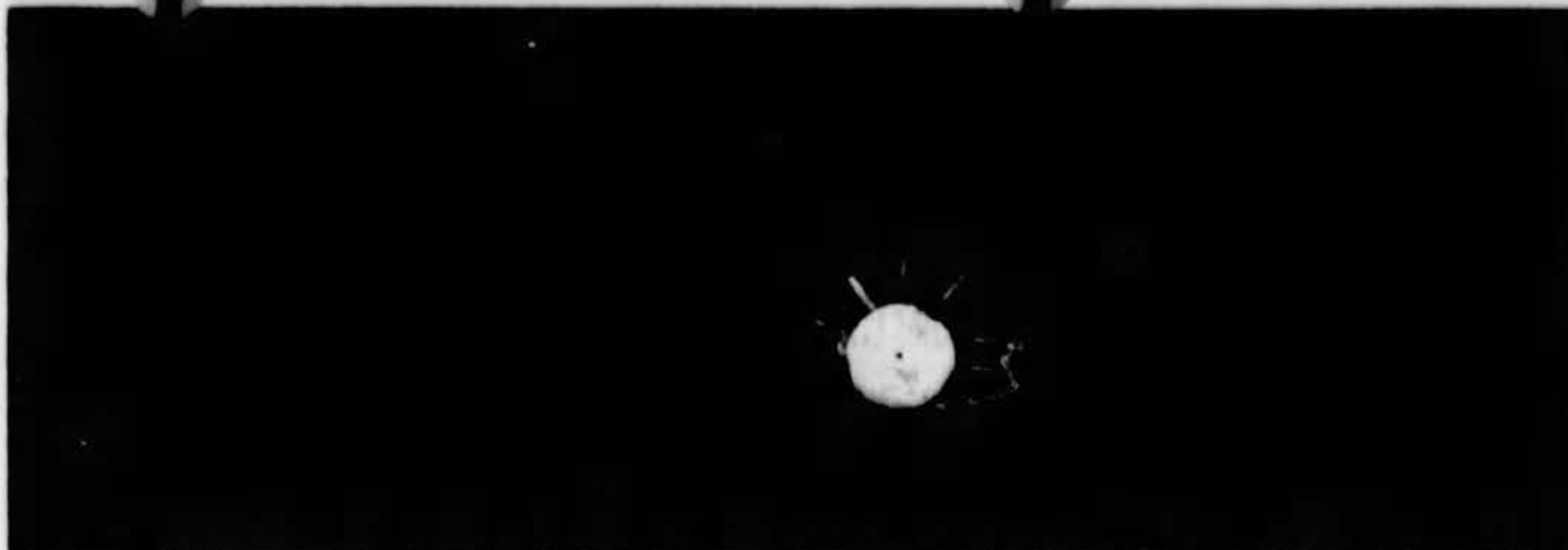
From the known size of an object and how much of our visual field it fills.



From our knowledge of perspective and the convergence of parallel lines at a great distance.



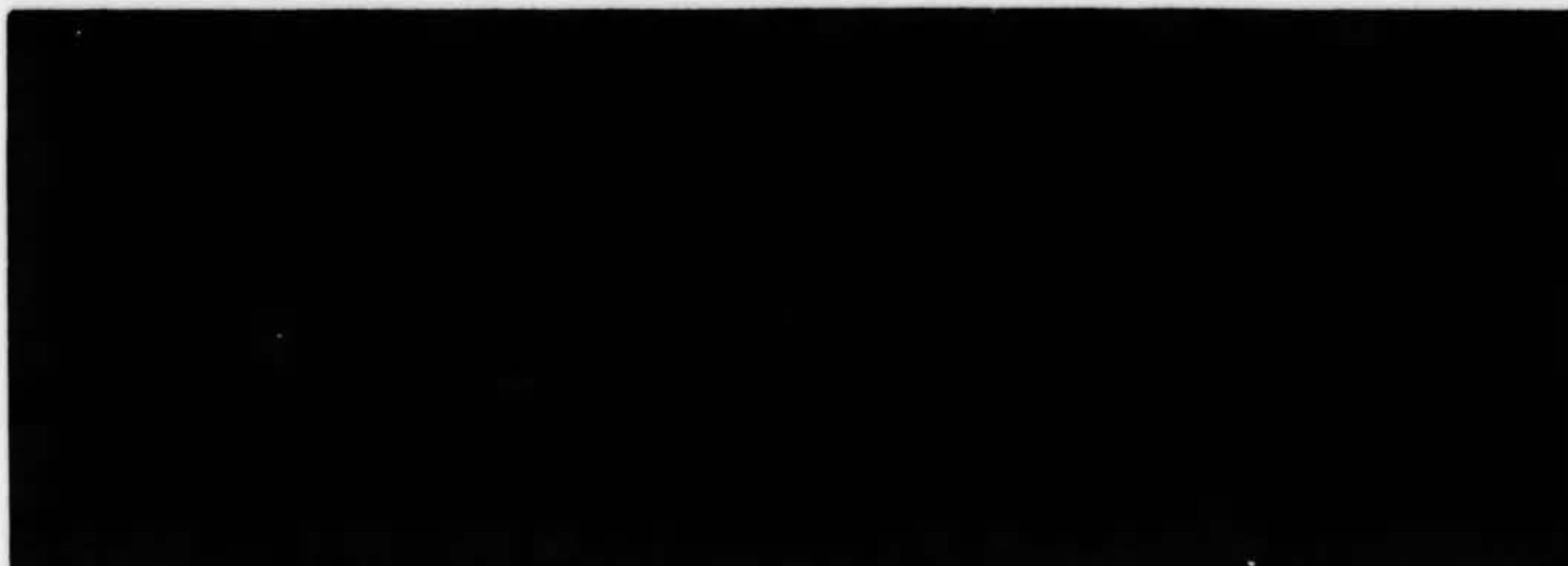
From overlapping — an object overlapped by another is known to be farther away.



From light and shadow – an object casts a shadow away from the observer if the light is nearer.



From aerial perspective – large objects seen indistinctly apparently have haze, fog, or smoke between them and the observer and therefore are usually at a great distance.



From terrestrial association – objects ordinarily associated are judged to be approximately the same distance.

ACCOMMODATION

The eyes change focus to see objects within about 20 feet, but do so almost not at all for distant objects.

SEEING AT NIGHT

It is easy for your eyes to play tricks on you at night when you stare for some time at a light - say, the tail-light of a lead airplane. What happens is technically known as autokinetic movement, or more commonly as stare vision. If the light is stationary, it may seem to move and swing in wide arcs. If the light is moving, it may seem to move to the side when it is actually going straight ahead. The cure for stare vision is don't stare - keep shifting your gaze from point to point.

Another common illusion at night is to see a light expanding or contracting at a fixed distance from you when actually the light is approaching or going away. Again, shift your gaze.

One last tip on seeing at night is to keep your windscreen scrupulously clean. Dust, grease, water droplets, scratches, and the like all obstruct your view, night or day. Many a speck on the windshield could, after a few hours, take on the silhouette of "an unidentified flying object."

With regard to color perception at night, blue and green lights are seen most easily; red and orange are seen least easily.



From motion parallax - When the observer fixes his sight on one object while his head or body moves, other objects apparently moving in the same direction as he are judged to be more distant, while those apparently moving in the opposite direction are judged to be nearer.

SECTION VII

Reporting

In reporting flying objects, there are certain major characteristics which should be noted. These include:

- (1) Number.
- (2) Shape.
- (3) Color.
- (4) Speed.
- (5) Acceleration.
- (6) Size.
- (7) Altitude.
- (8) Sound.
- (9) Light brightness.
- (10) Maneuver characteristics.
- (11) Range.
- (12) Direction.
- (13) Initial and final elevation.

Certain variable factors, such as the observer's position or movement during the sighting, speed of observer's aircraft, the position of the sun relative to the observer, the angle of elevation of the sun above the horizon and its bearing from true north as seen by the observer at the time of sighting, and the duration of the observation are important in determining final identification of the flying object.

An estimate of the number of feet at which an object is traveling above the aircraft's altitude may be substantiated by using the range capability of the radar gunsight.

Air Force Regulation 200-2, dated 12 August 1954, establishes procedures for reporting information and evidence pertaining to unidentified flying objects. The reporting format includes the following factors, which will serve as a guide to the observer in assessing the characteristics of flying objects:

(1) Description of the object(s):

- (a) Shape.
- (b) Size compared to a known object (use one of the following terms: Head of a pin, pea, dime, nickel, quarter, half dollar, silver dollar, baseball, grapefruit, or basketball) held in the hand at about arm's length.

- (c) Color.
- (d) Number.
- (e) Formation, if more than one.
- (f) Any discernible features or details.
- (g) Tail, trail, or exhaust, including size of same compared to size of object(s).
- (h) Sound. If heard, describe sound.
- (i) Other pertinent or unusual features.

(2) Description of course of object(s).

- (a) What first called the attention of observer(s) to the object(s)?
- (b) Angle of elevation and azimuth of the object(s). When first observed.
- (c) Angle of elevation and azimuth of object(s) upon disappearance.
- (d) Description of flight path and maneuvers of object(s).
- (e) Manner of disappearance of object(s).
- (f) Length of time in sight.

(3) Manner of observation:

- (a) Use one or any combination of the following items: Ground-visual, ground-electronic, air-electronic. (If electronic, specify type of radar).

(NOTE: Air-visual would be applicable here to the airborne observer).

- (b) Statement as to optical aids (telescopes, binoculars, and so forth) used and description thereof.

- (c) If the sighting is made while airborne, give type aircraft, identification number, altitude, heading, speed, and home station.

(4) Time and date of sighting:

- (a) Zulu date-time group of sighting:
- (b) Light conditions (use one of the following terms): Night, day, dawn, dusk.

- (5) Locations of observer(s). Exact latitude and longitude, or Georef position, or position with reference to a known landmark.

- (6) Weather and winds-aloft conditions at time and place of sightings:

- (a) Ceiling.
- (b) Visibility.
- (c) Amount of cloud cover.
- (d) Thunderstorms in area and quadrant in which located.

(7) Any other unusual activity or condition, meteorological, astronomical, or otherwise, which might account for the sighting.

(8) Interception or identification action taken.

(9) Existence of physical evidence, such as materials and photographs.

While the above format should be used in reporting unidentified flying objects, there are other details which are helpful to the observer in identifying the flying object, or in reporting its characteristics.

These include:

(1) Relation of the size of the object to the size of the moon or the sun.

(2) Various types of sound, such as rumbling, whining, humming, swishing, explosive, or jet or rocket-type sound.

(3) Color may be described in terms of the color spectrum, with additional details to indicate metallic or luminous characteristics.

(4) Speed may range from a stationary or hovering position to 100 to 400 miles an hour, or to a speed similar to that of a meteor.

(5) Shape may vary from that of a conventional aircraft to that of an unconventional aircraft and may be described as elliptical or disk-shaped, cigar-shaped, propeller-shaped, conical, rocket-like, meteor-like, or having the characteristics of tails of flame or fire.

(6) Light brightness may be described in terms of dullness or brilliance, by comparison to moonlight, or to the reflection of sunlight on various metals, such as aluminum, or a mirror, or on dull surfaces such as stone or plaster.

(7) The degree of brightness may be related to the apparent distance of the object.

(8) Angular velocity, that is, speed measured in degrees, may vary from zero through very slow, slow, moderate, rapid, very fast, extremely fast (90 degrees per second) to more than 90 degrees per second.

(9) Angular acceleration, or change in angular velocity, may increase or decrease slowly, fast, or very fast.

SUMMARY

The various manifestations that are created by meteorological, astronomical, physiological, or psychological phenomena have been discussed with the intent of assisting the aircrew member in observing and reporting unfamiliar flying objects.

To date, the flying objects reported have imposed no threat to the security of the United States and its possessions. However, the possibility that new air vehicles, hostile aircraft, or missiles, may first be regarded as unfamiliar flying objects by the initial observer is real.

The United States Air Force is charged with the responsibility of safeguarding the United States and its possessions, as well as US forces abroad, from any threat that may arise from the air. In order to discharge this responsibility, it is imperative that all unfamiliar flying objects be reported accurately, so that identification may be made through subsequent investigation.

Current Air Force regulations outline the procedures for reporting unfamiliar flying objects. However, it is believed that a clearer understanding of many natural phenomena, and of how to recognize the conditions under which they occur, will add to the validity of subsequent reports.

VER SHEET										SUSPENSE				
ORIGIN OF BASIC										DATE				
										ASSIGNED BY				
DATE					TYPE					NO.				
SUBJECT AIDS TO IDENTIFICATION OF FLYING OBJECTS														
ROUTING														
<i>Initial "IN" column to denote review prior to action. Initial "OUT" column to denote review of completed action. (X for action; ✓ for coordination.)</i>														
IN	OFFICE	OUT	IN	OFFICE	OUT	IN	OFFICE	OUT	IN	OFFICE	OUT	IN	OFFICE	OUT
	OIN-1			OIN-2			OIN-3			OIN-4			AFOIN	
	OIN-1X			OIN-2X			OIN-3X			OIN-4X			AFOIN-X	
													AFOIN-X	
													AFOIN-X1	
													AFOIN-X2	
													AFOIN-X3	
													AFOIN-X4	
													AFOIN-X5	
													AFOIN-Z	
													CABLES	
													FILE	
													DISPATCH	
TO: AFCIN-4X ATTN: Mr. Arcier										DATE 10 Oct 57				
FROM: AFCIN-X1A										COMMENT NO. 1				
COMMENTS (Use reverse, if necessary) Mr. Sanderson/pah/74903														
1. The attached copy of letter from USAFE with inclosure "Aids to Identification of Flying Objects" is forwarded for your comments on which to base a reply.														
2. Request comments be directed especially to the accuracy and sufficiency of material therein as well as its possible use by other agencies and the general public.														
3. Request ^{reply} NLT 25 October 1957, in order that General Lewis' reply to Col. Rogers be prepared promptly.														
<i>Norman N. Perlberg</i> NORMAN N. PERLBERG Lt Colonel USAF AFCIN-X1A														
Incl.														
1. Ltr to Gen. Lewis fr Col Rogers 30 Sept 57 2. Booklet														

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SUBJECT: Aids to Identification of Flying Objects

TO: AFCIN-X1A

FROM: AFCIN-4

24 OCT 1957

Comment Nr. 2

4E4/Capt G.T. Gregory/
wm/69216

1. Attached publication, prepared for the most part from Project Blue Book, AFR 200-2 and other pertinent guide material originally prepared by this Center, is a commendable effort towards the philosophy enunciated in the D/I-ATIC conferences last spring; that all USAF units be given guides and assistance to properly identify seemingly unidentifiable aerial objects.

2. Up to this time, the only aids to UFO investigation and field analyses have been given to AISS and GOC units (See inclosures 3 and 4, "UFO Guide" now being revised, and GOC "UFO" Poster).

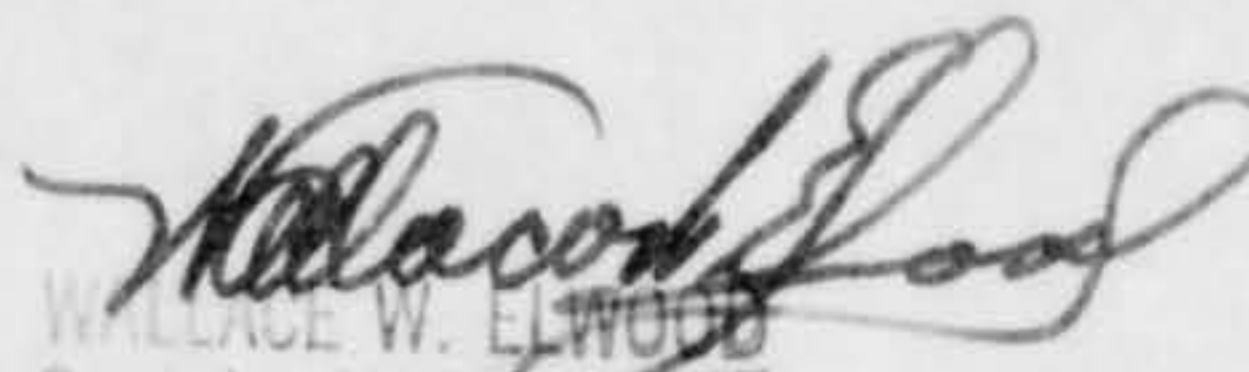
3. A complete review and revision of subject publication would require a respectable effort, which cannot be accomplished within the deadline given in par. 3 of preceding comment. However, a review has disclosed the omission of certain key points, significant clues and leads to UFO identification, and other explanatory items. A number of items were revised; others were clarified. A number of illustrations are submitted to properly clarify or explain key phenomena (Figures 1 through 11). (See inclosure 5, detailed review and suggested revisions.)

4. It would have been more desirable if a draft of the publication had been submitted to the Center for review and corrections, assuming the guide in question is a "final publication item". If not, then it is suggested that it be recommended to USAFE that the revisions, additions and illustrations submitted here be incorporated into the proposed final publication.

5. The UFO guide and GOC poster (inclosures 3 and 4) may also be submitted to USAFE, and should include the original UFO guide prepared for Air Force units "How to make UFLYBRPTS", attached (inclosure 6) both for possible use in the USAFE guide and to demonstrate that the Air Force has not been remiss in UFO material and publications as the letter from USAFE appears to indicate.

6 Incls

1. Ltr to Gen Lewis fr USAFE
2. UFO Guide Booklet
3. UFO Guide - Rough Draft
4. GOC Poster
5. Suggested Revisions to UFO Guide
w/12 illustrations
6. ATIC Guide "How to Make UFLYBRPTS"


WALLACE W. ELWOOD
Captain, USAF
AFCIN-4X2a

**DRAFT UFO GUIDE
TO - U.K.**

FILE CLASS: _____
OFFICIAL FILE CO

4E4/Capt G.T. Gregory/wm
69216

OFFICE OF RECORD

12 FEB 1958

SUBJECT: (U) Aids to Identification of Flying Objects

AFCIN-4X2c TO: Office of the Air Attache
ATTN: Col R.W. McDuffee
U.S.N., F.P.O. 100
New York, New York

1. Attached is a draft copy of a proposed "Identification to Flying Objects" which this Center is in the process of revising. For purposes of expediency, a copy of the "suggestions and revisions sheet", and illustrations to be added to the draft are forwarded.

2. Subject material is forwarded in accordance with an informal request made to Captain Gregory of this Center. The material is similar to that used by Headquarters USAF for the identification of UFOs and recently revised by this Center.

3. Because of current budgetary limitations and manpower restrictions, publication and dissemination of the proposed guide, on a USAF-wide basis, within the near future is unlikely. Therefore, the material may be used as a "master" for the preparation of a document or guide to be assembled by your office in any format desired or as dictated by the requirements of your organization or operations.

4. It should be stated, as a matter of guidance, that a large number of UFO reports submitted from overseas commands and facilities could have been resolved on the spot, by a check and investigation of all pertinent local facilities, and conducting a preliminary field analysis as prescribed in par. 5, AFR 200-2.

5. Also attached is Department of Defense and other material reflecting the work, findings and other aspects on the Air Force "UFO Program." This, together with the aforementioned guide, should provide all basic data necessary for training, indoctrination or informative purposes.

FOR THE COMMANDER

WALLACE W. ELWOOD
Captain, USAF
Assistant Adjutant

PERM	
TEMP	
90 DAYS	
INITIAL	

- 4X1
- OTHERS 4 Incls
1. Cy, "Aids to Ident of UFOs"
 2. Suggested Revisions w/11 Illus
 3. USAF Questionnaire
 4. DOD Releases

MEMO ROUTING SLIP

NEVER USE FOR APPROVALS, DISAPPROVALS, CONCURRENCES, OR SIMILAR ACTIONS

NAME OR TITLE

Col. Wackwitz

INITIALS

WV

CIRCULATE

ORGANIZATION AND LOCATION

AFCIN-4B

DATE

COORDINATION

FILE

INFORMATION

NECESSARY ACTION

NOTE AND RETURN

SEE ME

SIGNATURE

2 Capt Gregory

Thanks. I suspect

3 there is more to this than meets the eye. The point here is that

4 the Communies do sit up nights thinking up new

REMARKS

address how to confuse us. Reference our recent private discussion re your theory that the UFO hysteria could be used as a devilish, clever psychological warfare weapon ^{by the Communies} to continuously disrupt the Air Force.

Attached is my ex-chief and friend, under whom I served in a civilian capacity here in ATCC, and now Air Attache, England.

The letter is personal. However, it's remarkable how his personal viewpoint of the situation parallels your conclusions.

FROM NAME OR TITLE

Capt. Gregory

DATE

25 Nov 57

ORGANIZATION AND LOCATION

454 (Navy)

TELEPHONE

67206

DD FORM 95
1 FEB 50

Replaces DA AGO Form 895, 1 Apr 48, and AFHQ Form 12, 10 Nov 47, which may be used.

16-48487-4 GPO ☆

**DRAFT - UFO GUIDE
TO FEAF**

FILE CLASS: _____
OFFICIAL FILE COPY

OFFICE OF RECORD

5FITI, Hq Fifth Air Force, 5 Nov 57, Subj: Information Requested by JASDF

AFCIN-4E4

1st Ind

4E4/Capt G.T. Gregory/wm/69216

AFOIN-4X2b AIR TECHNICAL INTELLIGENCE CENTER, Wright Patterson Air Force Base, Ohio 29 NOV 1957

TO: Commander, Fifth Air Force, ATTN: 5FITI, APO 925, San Francisco, California

AFOIN-4X2c

AFOIN-4X3

AFOIN-4X4

AFOIN-4A

AFOIN-4B

AFOIN-4C

AFOIN-4D

AFOIN-4E

AFOIN-4F

OTHERS

1. Attached is a draft copy of a proposed "Identification to Flying Objects" which this Center is in the process of preparing, editing and revising. For purposes of expediency, a copy of the "suggestions and revisions sheet", and illustrations to be added to the draft are forwarded.

2. Because of current budgetary limitations and manpower restrictions, publication and dissemination of the proposed guide on a USAF-wide basis within the near future is unlikely. Therefore, the material may be used as a "master" for the preparation of a document or guide to be assembled by your office in any format desired or as dictated by the requirements of the Japanese Air Defense Command.

3. Also attached is Department of Defense and other material reflecting the work, findings and other aspects on the Air Force "UFO Program". This, together with the aforementioned guide, should provide all basic data necessary for training, indoctrination or informative purposes.

FOR THE COMMANDER

Incls

1. Cy, "Aids to Ident of UFOs"
2. Suggested Revisions w/ll Illus
3. USAF Questionnaire
4. DOD Releases

ROBERT E. O'CONNOR
Captain, USAF
Assistant Adjutant

1 4E4, L.T. Gregory 23 Nov 57
2 4E4, H.A. Wiley 25 Nov 57
3 4E H.R. [unclear]

DISPATCHED

NOV 23 0 34 AM '57 NOV 23 0 34 AM '57

PERM	
TEMP	
90 DAYS	
INITIAL	

SUGGESTED REVISIONS AND ADDITIONS TO UFO AID

Page 1

DEFINITION: Insert, after 2nd paragraph: "unidentified aircraft" are not within this definition of unidentified flying objects; hence should not be a basis for the submission of UFO reports within the meaning of AFR 200-2. The reporting of "unidentified aircraft" usually results from the sighting of an aircraft which is readily identifiable as an aircraft, but whose origin, type, purpose, destination, etc. may not be known. These are the responsibility of air defense and other pertinent units, and should be "screened" or "filtered" out from the UFO reporting system. This should include jet exhausts, parachute flares, condensation trails, navigation lights or other phenomena known to originate from aircraft or aircraft operations, although the aircraft themselves may not be immediately identified. These "unidentified" familiar objects are not "UFOs".

Page 3

BALLOONS: 2nd paragraph, 5th line: Change "one hundred feet" to read "two hundred feet".

After 2nd paragraph, insert separate paragraph substantially as follows: The majority of balloons released at night carry one or more "running lights", which often contributes to weird or unusual appearances. Many balloons carry metallic, triangular shaped "corner reflectors" suspended some distance below the balloon proper (Fig. 1). Larger, research types, may rise considerable distances before becoming fully inflated, and may often be flattened on top until completely expanded (See Fig. 2). Partially inflated balloons may be caught in

jet streams, assume near horizontal positions, and move with considerable speed. Encountering a flat, circular object (balloon flattened on top) under darkness or adverse weather conditions, arising from below can be startling even to experienced pilots.

Separate paragraph: Balloons can be observed when the sun is behind the horizon and the earth is in comparative darkness (See Fig. 3). This has resulted in a considerable number of UFO reports over the last ten years. The two general "clues" here is that a. the sighting usually is observed just before dawn or little after sunset and b. the shape of the UFO appears either as "disc" or "spherical" and bright reddish-orange, pink, or reddish-white. The coloration is caused by the sun's slant rays reflecting off the balloon's surfaces.

Page 4

ASTRONOMICAL BODIES: Separate paragraphs substantially as follows: Meteors will appear to vary in shape from round to elongated, tear-drop in shape, and in size from tiny pinpoints to the size of the moon. Colors will range from yellowish-white through red, blue and green hues depending on the atmosphere.

Although observed singly, meteors may be observed in clusters. The time in sight is generally less than 10 seconds. Although improbable that meteoric bodies themselves can be picked up on radar, the meteor trails are generally good reflectors and will often "paint" on radarscopes.

An extremely brilliant, rarely seen form of meteorite is called a "fireball". Fire balls, unlike ordinary meteorites, do not burn

themselves out in the upper atmosphere, but persist into the lower levels crashing into the earth's surface. A fireball that explodes before reaching the earth's surface is usually referred to as a "bolide". An encounter with a fireball during darkness can be a frightening experience, as these bodies can suddenly illuminate the surroundings with a dazzling, daylight intensity.

Conclude with (separate paragraph): It has been repeatedly proved that attempting to observe objects later found to be stars, planets or other apparently fixed celestial bodies, through hand-held binoculars or glasses will often give an illusion of unusual maneuvers, trajectories and speeds. This is particularly true when such bodies are observed under adverse sky or weather conditions.

Page 5
and 21

RADAR SIGHTINGS: Comment: The summary section (page 5) and the detailed Section III (page 21) gives the impression that unidentified objects observed on radarscopes are primarily the result of temperature inversions and other meteorological causes. The following, in substance, should be integrated, as desired, into both sections:

1. "Spurious" blips or returns may also be caused by
 - a. Mutual interference between radar units
 - b. Jamming
 - c. Unknown malfunctioning of equipment
 - d. Radar target simulators
2. Even experienced radar operators can err in interpreting radar returns. This is particularly true when operating personnel from radar units located in stable-weather areas are assigned to

localities subject to unusual, turbulent or suddenly changeable weather conditions. Such conditions are generally conclusive to anomalous propagation (See Fig 4 and 5).

3. Ten years experience in the investigation and analyses of the UFO phenomena reported by radar units, has disclosed numerous instances where both airborne and ground radar units have observed what apparently were objects in the air, and found to have actually been ground objects. This was caused by temperature inversions (See Figs 7, 8 and 9).

Page 8

NEW FLYING OBJECTS: Suggest 1st paragraph be changed to read: There are two new radar aircraft now in existence which to the uninitiated may appear as unidentified flying objects or so-called "flying saucers", because of saucer-shaped radar antennas that are affixed to their fuselage (See Fig 6 - WF-2 Radar Aircraft, and the radar Super Constellation).

Page 9

It should be strongly emphasized that many swept-back and delta-wing aircraft can appear as weird and unusual flying objects, particularly when observed under adverse weather or light conditions (See Figs. 10 and 11, Block of Aircraft Photos). The Air Force is in daily receipt of UFO reports describing "flying saucer" objects, which upon investigation are found to be aircraft of the configuration discussed here.

Page 16

METEORS: 1st paragraph, 5th line. Change "24,000,000 meteors" to read "approximately 200,000,000 meteors."

Add separate paragraph on "annual meteoric showers", substantially

as follows: Each year the earth passes through certain meteoric showers at specific times each year, which invariably results in a large number of UFO reports. These annual showers can be exceptionally brilliant, having thousands of meteors and meteor trails. Some of the most prominent of these are the Perseids (August), Orionids (October) and the Leonids (November). The Leonids, for example, which last for approximately 7 days and reaches its maximum about November 16, has provided close to 200,000 meteors between midnight and dawn. Any good astronomical text will furnish the dates and schedules of these periodical showers.

Page 23

Partial paragraph continued from page 22, should read "... may cause the appearance of two or more targets on the radar screen. In some instances hundreds of returns may appear.

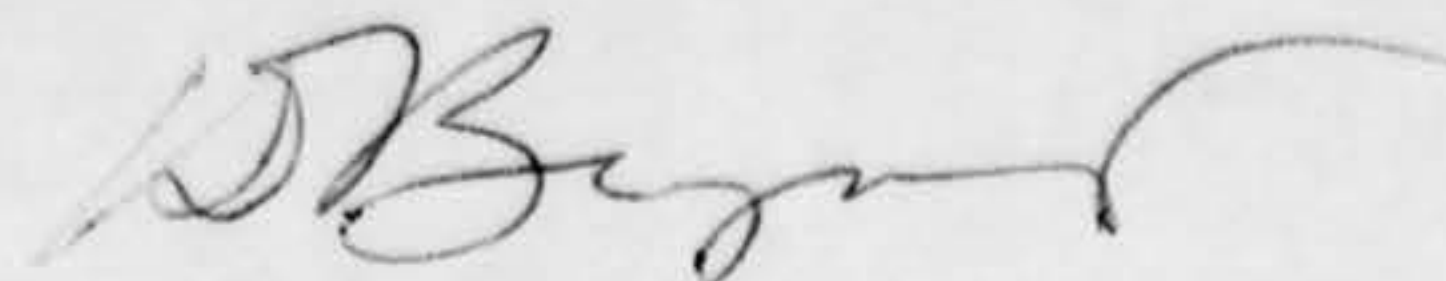
MEMORANDUM TO CAPTAIN GREGORY

18 Oct 1957

The data included in the radar portion is correct (with one exception), there is a great deal of information which should be included but which is not there. Some explanation regarding returns due to anomalous propagation which appear as very fast moving targets should be included, since this is one of the principal types of radar reports received.

It should be emphasized that this task would require a respectable effort, and couldn't be dashed off in a matter of a few minutes to meet a short deadline. Some good scope photos of actual anomalous propagation and samples of interference from other radars, returns from clouds, etc, would appear to be more informative than the diagrams and scope sketches showing normal and abnormal propagation which are in the article.

The exception noted in the first paragraph is to the statement that an interfering radar will give one or two returns on the scope. Actually there will usually be many times this many - hundreds of them, in fact. It is true that they are usually easily recognizable.



V. D. BRYANT
AFCIN-4E1a

SECTION I

Flying Objects and Their Characteristics

DEFINITION

Air Force Regulation 200-2 defines an unidentified flying object as any airborne object which by performance, aerodynamic characteristics, or unusual features does not conform to any presently known aircraft or missile type, or which cannot be positively identified as a familiar object.

Unusual weather or light conditions may transform many familiar objects into unidentified flying objects. The speed of the observer's aircraft and sudden climb or descent may produce distortions of vision which cause known objects to hover, perform erratic maneuvers, or glow and scintillate during hours of darkness. Many of these flying objects can be identified as follows:

- (1) Conventional aircraft observed from unusual angles.
- (2) Modern jet aircraft flying at great speeds and high altitudes.
- (3) Reflections of sunlight, moonlight, and starlight from aircraft and balloons at great heights.
- (4) Searchlight reflections on clouds.
- (5) Meteorological and upper air research balloons.
- (6) Meteors, comets, and stars.
- (7) Planets observed at certain times of the year.
- (8) Meteorological phenomena.
- (9) Cloud formations.
- (10) Birds, especially migratory formations.
- (11) Dust and haze.
- (12) Kites, fireworks, and flares.
- (13) Rockets.
- (14) Contrails.

A meteor, a comet, a balloon, or an aircraft, under certain conditions, assumes speeds, movements and shapes which are entirely uncharacteristic of the object under normal circumstances. Aircraft at great heights can appear wingless and projectile-shaped. Objects that appear to hover or move very slowly could be balloons. Flame-tinged, or brightly glowing objects, and those objects appearing to leave a trail of light in their wake may frequently be identified as meteors or comets. Another explainable phenomenon may be caused by the sun's illumination of vapor trails. Moving lights at night, or shiny objects in the daytime, traveling at moderately fast speeds, could be aircraft.

21 NOV 1957

Colonel Craven C. Rogers
Deputy Chief of Staff, Intelligence
Headquarters, U. S. Air Forces in Europe
APO 633
New York, New York

Dear Buck,

Reference your letter of 30 September, forwarding copies of your booklet on "Aid to Identification of Flying Objects", ATIC reviewed the booklet and felt it was a commendable effort toward solving one of our UFO headaches. However, they felt it would have been more advantageous to you if it had been reviewed by them before publication. It seems that the philosophy of the UFO's has changed since the publication of Project Blue Book and other earlier material. Their review disclosed the omission of certain key points, significant clues and leads to UFO identification, and other explanatory items.

We are in the process of revising AFR 200-2 in order to incorporate some of these new ideas, and to delineate responsibilities for various aspects of the UFO program.

I am sending along for your information the material prepared by ATIC regarding your booklet.

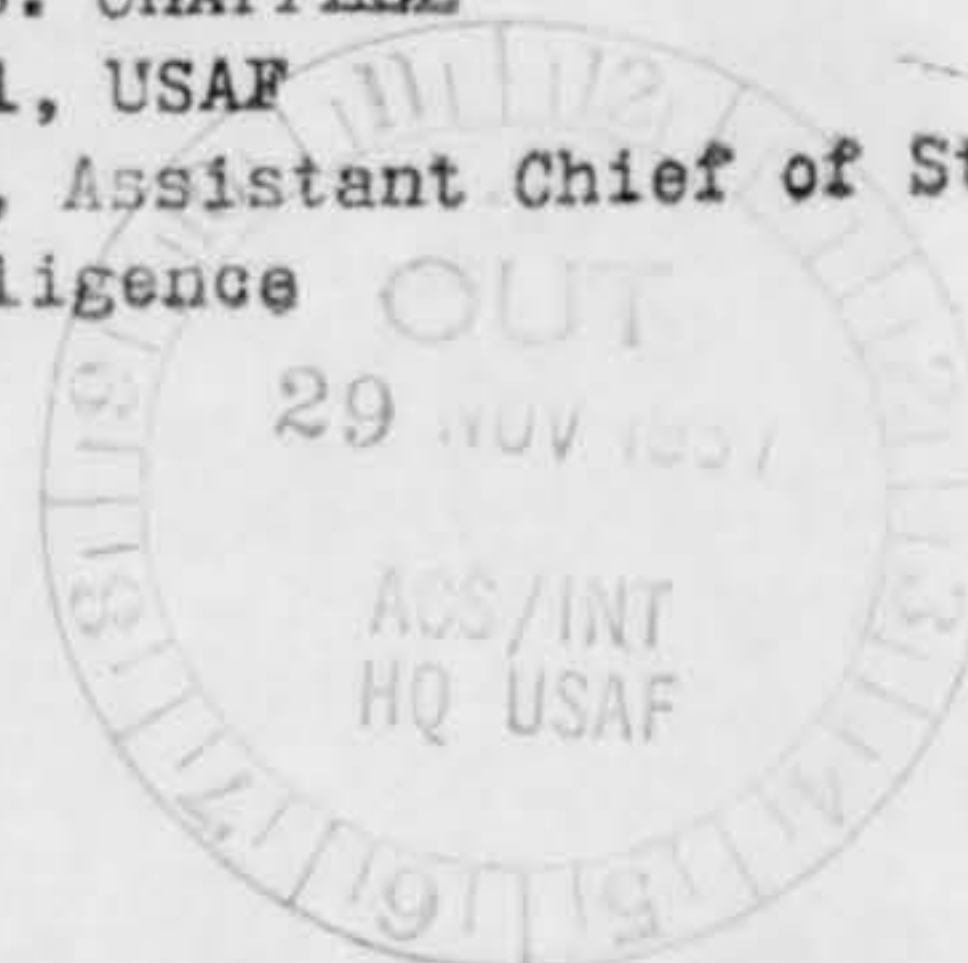
4 Incls

1. UFO Guide - Rough Draft
2. GOC Poster
3. Suggested revisions to UFO Guide w/12 illustrations
4. ATIC Guide "How to Make UFLYBRPTS"

COORDINATION:

AFCIN-XI
Col Hurley
L/Col Perlberg
Mr. L. Sanderson

FRANK B. CHAPPELL
Colonel, USAF
Office, Assistant Chief of Staff,
Intelligence



Coord cy
ACS Cross ref
XI Comeback
XI Stayback

*File in UFO
Folder*

Air Technical Intelligence Liaison Office

5FITI

5 NOV. 1957

SUBJECT: Information Requested by JASDF

TO: Director
Air Technical Intelligence Center
ATTN: AFCIN-4E4 (Capt Gregory)
Wright-Patterson Air Force Base, Ohio

During a course of training given to JASDF (Japan Self Defense Force) intelligence personnel on ATI training, considerable interest was shown on the subject of unidentified flying objects. Request any unclassified reports published by ATIC on this subject which could be given to JASDF personnel.

JACK S. ZEIGLER
Lt Colonel, USAF
Director, ATIL
DCS/Intelligence

18 NOV 25 10 30

HEADQUARTERS
UNITED STATES AIR FORCES IN EUROPE
Office of the Deputy Chief of Staff, Intelligence

SEP. 30. 1957

APO 633, New York, N.Y.

Major General Millard Lewis
Assistant Chief of Staff, Intelligence
Headquarters, United States Air Force
Washington 25, D.C.

Dear Chief:

Please find attached copies of our publication on unidentified flying objects. Over the past several years all of us in this business have been concerned, directly or indirectly, with this subject. In fact, even here in Europe we are plagued by reports from even our own people which are so poorly rendered that we cannot make head nor tail out of them.

This booklet was published and intended to be used as a training aid and reporting guide. As stated in the first pages, there is no intent to discourage reporting, but rather to acquaint the observer with what he may actually be looking at. We find it mighty discouraging when air crews with thousands of hours to their credit make fantastic reports of what we often know to be natural phenomena.

Other publications may have been prepared in the past by other agencies, but a thorough search by my people failed to locate any real usable aid.

The thought occurs to me that this could well be only the first step in acquainting our people with this sort of thing, and that perhaps ATI could, for example, develop a system of colored slides to be used in a course of instruction on the subject. Perhaps it should be included as a part of our flying training instruction, and it might also be of use to ADC in assisting their Ground Observer Corps. On the other hand, considering reports which we have all seen from commercial air lines people we might make money by offering something of this nature to them.

I hope that in this year of austerity we have not duplicated anyone else, and would appreciate your reaction to the booklet and the suggestions made herein.

DCS/INTEL.. IDC-DC
CONTROL NUMBER 5 .. 09700 Sincerely,

Buck

1 Incl: Booklet (10 cys)

C. C. ROGERS
Colonel USAF
DCS/Intelligence

OFFICE OF RECORD

ISOC, HQS 4602d AISS (ADC), 25 Apr 57, Subj: UFOB Guidance Material

AFOIN-4

AFOIN-4E4

1st Ind 4E4/Capt G.T. Gregory/wm/69216

AIR TECHNICAL INTELLIGENCE CENTER, Wright Patterson Air Force Base,

AFOIN-4X2b Ohio 21 MAY 1957

TO: Commander, 4602d Air Intelligence Service Squadron (ADC), Ent
Air Force Base, Colorado Springs, Colorado

AFOIN-4X2c

1. This Center is currently in process of preparing subject
guidance material requested, and should be forthcoming within two
weeks of this date.

AFOIN-4X3

AFOIN-4X4

2. The known difficulty in attempting to provide guidance
material on such a complex subject as UFOs, and this Center's desire
to present, in a simple manner, the numerous clues, hints, leads and
indications to assist both field investigators and lay observers in
evaluating and explaining UFO sightings, dictates that the matter be
approached properly.

AFOIN-4A

AFOIN-4B

3. Additional research and data is required on all the possible
effects that various objects (aircraft, balloons, astronomical bodies,
etc) can produce under certain conditions. For example, in a study
of UFO reports which indicate binoculars were used at night, there is
almost invariably the statement "flashing, erratic or zig-zagging"
movements of the UFO. While the reason is obvious to those involved
in UFO analyses, the fact that binoculars, focused on a star, planet
or moving spot of light, will produce these precise movements if
hand-held is often not considered even by experienced intelligence
and interrogating personnel. Also, the fact that a large number of
weather and research balloons carry lights, which can produce unusual
appearances and maneuvers at night, is generally unknown to many.

AFOIN-4C

AFOIN-4D

4. It is suggested that the numerical guidance items under each
subject item of an appendix, be followed with a brief, informal
commentary on other effects, appearances and maneuvers of each object
under given conditions. The material being prepared is designed with
this view in mind, and may be used as deemed necessary to your
particular requirements.

AFOIN-4E

FOR THE COMMANDER

1 KEY 8T Gregory 20/5/57
2 KEY 8T Gregory 20/5/57
3 4E 8T Gregory

AFOIN-4F

1 Incl
n/c

T. J. CONNAIR, JR.
MAJOR, USAF,
Adjutant

2

OTHERS

AFOIN-4X1

PERM	
TEMP	
90 DAYS	
INITIAL	

25 Apr 1957

AISOC

SUBJECT: UFOB Guidance Material

TO: Commander
Air Technical Intelligence Center
ATTN: AFOIN-4E4
Wright Patterson Air Force Base
Ohio

1. Reference is made to the conversation, 17-18 Apr 57, between Captain Gregory, your center, and A/IC Barth, this organization, concerning UFOB guidance material.

2. In accordance with the views expressed by Captain Gregory, this organization will publish a change to 4602d AISS Squadron Guide 200-2 on/about 1 June 1957.

3. The material to be incorporated into this change includes:

a. An expanded section on meteors, drawn primarily from your letter, AFOIN 4E4, Subject: UGOB Guidance Material - Meteors and Meteoric Showers, dated 14 Nov 56.

b. A new section on Radar Scope UFOBs, including the article from "Electronic Week", which your center forwarded to this organization, and an explanation of Anamalous Propagation.

c. An expanded section on balloons.

4. In order to assist this organization in accomplishing this change, request your center prepare:

a. A discussion on Anamalous Propagation.

b. Any information on balloons which your center deems appropriate for inclusion in the change.

c. Possible suggestions for expanding any of the other sections of Appendix "A", Squadron Guide 200-2, a copy of which is attached.

FOR THE COMMANDER:

/s/ RICHARD B. RANDLE
Major, USAF
Asst Adjutant

1 Incl
App A, SG 200-2

CIRCA 1957
ATI SCHOOL LECTURE (GREGORY)

7-3745-392

1003856

SMC

RETURN TO
USAF Historical Archives
ASI(ASHAF-A)
Maxwell AFB, Ala 36112

UNCLASSIFIED

AIR TECHNICAL INTELLIGENCE BRIEFING

RETURN TO

USAF Historical Archives
ASIA(ASHAF-A)
Maxwell AFB, Ala 36112

ATTN: Archives Branch
Maxwell AFB, Alabama

ATI SCHOOL TRAINING LECTURE

" THE UFO PROGRAM "

SMC

(For two one-hour class periods)



AIR TECHNICAL INTELLIGENCE CENTER
WRIGHT-PATTERSON AIR FORCE BASE
OHIO

1003856

1. Information conflicting with or pertinently affecting that contained in this publication should be forwarded by the recipient directly to:

Commander
Air Technical Intelligence Center
Wright-Patterson Air Force Base, Ohio

This in no way abrogates or alters responsibility for sending such information or any pertinent intelligence data through already established intelligence collection channels of the various services or agencies of the U.S. government.

2. WARNING: This document contains information affecting the national defense of the United States within the meaning of the Espionage Law, Title 18, U.S.C., Sections 793 and 794. Its transmission or the revelation of its contents in any manner to an unauthorized person is prohibited by law.

to determine that there is a certain amount of work that must be done each day, which does not mean suspense slip items...was explained to you.

Therefore, I feel that I must take this informal means in requesting some help. It is difficult for one man to be Project Officer, analyst, administrator, policy planner, speech and brief preparer, lecture writer and a host of a million other things which are not apparent even to ~~others~~ sitting nearby.

The attached example which had to be accomplished within 2 days in the midst of other high priority and interrupting things is the sort of a thing that cannot be done week after week, by one man.

Again I should like to apologize, but I feel this matter has reached a stage where I must ask for help.


Capt Gregory

MEMO ROUTING SLIP

NEVER USE FOR APPROVALS, DISAPPROVALS,
CONCURRENCES, OR SIMILAR ACTIONS

1 NAME OR TITLE <u>Dr. Miley</u>	INITIALS <u>[Signature]</u>		CIRCULATE
ORGANIZATION AND LOCATION	DATE <u>[Signature]</u>	X	COORDINATION
2			FILE
<u>2 one-hour periods</u>			INFORMATION
3 <u>1330 to 1530</u>			NECESSARY ACTION
<u>in classroom #4</u>			NOTE AND RETURN
4 <u>(10 minute break)</u>			SEE ME
			SIGNATURE

REMARKS Doctor, I hate to burden you with my troubles as you have plenty of your own. However, here is one reason why I have been working Saturdays and Sundays for the last 4 months.

As you know, General Lewis' 30 minute briefing, which used only 3 slides shook the place up for 3 days in order to prepare it. This lecture is for 2 one hour ATI class periods and utilizes almost a half a hundred slides. Generally, something of this order requires weeks of preparation. I was given the requirement from Col Ericson, thru Major Zimmerman less than a week ago. It had to be given Monday afternoon - which it was.

I am at my desk, as you know, practically from 7 to 5:30 every day, and the majority of the time I do not take the required half hour for lunch, to carry out the work of this branch. All remarks to the effect that I ^{should} take it easy or to "stop worrying" (generally from people who do not know or will not take time out (over))

FROM NAME OR TITLE	DATE
ORGANIZATION AND LOCATION	TELEPHONE



Jet vapor trails illuminated by the sun.

to determine that there is a certain amount of work that must be done each day, which does not mean suspense slip items...was explained to you.

Therefore, I feel that I must take this informal means in requesting some help. It is difficult for one man to be Project Officer, analyst, administrator, policy planner, speech and brief preparer, lecture writer and a host of a million other things which are not apparent even to ~~others~~ sitting nearby.

The attached example which had to be accomplished within 2 days in the midst of other high priority and interrupting things is the sort of a thing that cannot be done week after week, by one man.

Again I should like to apologize, but I feel this matter has reached a stage where I must ask for help.


Capt Gregory

LECTURE ON
THE UFO PROGRAM
FOR THE AFI SCHOOL

GENERAL:

I consider it a distinct privilege to be able to speak to you today and to have the opportunity of meeting a class which has members that will become part of an organization upon which so much depends with regard to the Air Force's UFO project.

Unidentified Flying Objects, or "UFOs" are referred to as "Flying saucers" by the general public and by the majority of nontechnical writers and publishers on the subject. We don't like the name "flying saucers", not because only a very small amount of the objects are reported as saucer shaped - but because it represents weird stories, many of which are purposely calculated to frighten the general public. The Air Force definition of UFOs is "any airborne object which, by performance, configuration, aerodynamic characteristics or unusual features, does not conform with any presently known or projected aircraft or missile" - - more generally, we think of them as anything airborne which cannot be identified as known or explainable objects.

The general purpose of this briefing is to give you some background, the status and progress, and the general operations of the UFO program as well as to provide you with some guidance for the part that you may play in this highly controversial field.

BACKGROUND:

At this point a brief background and history of the UFO program should help to determine the progress and status of the program, and to understand some of its problems and complexities.

The program started in 1947, when on 27 June of that year, a private civilian flyer named Kenneth Arnold, sighted several disc-like objects near Mr. Rainer in the State of Washington. He described them as "flying saucers", a term which was forcibly, and with much sensationalism brought to the public's attention. The writer's and newspapers somehow picked it up. There was a considerable amount of speculation, theory, conjecture, and assumption as to the nature and existence of this phenomena. As a result, the Air Force was given the responsibility of investigating and analyzing these phenomena, and given the name of Project "Sign".

From June 1947 to February 1949, when the name of the program was changed to "Project Grudge", approximately 375 UFO reports were collected and analyzed. In August 1949, a report on the results was submitted to the Directorate of Intelligence. The average number of unexplained sightings or "unknowns" for this period was approximately 20%. It was concluded that these reports were due, primarily, to:

- (1) Misinterpretation of conventional objects, aircraft, balloons, astronomical bodies, etc.
- (2) War nerves or mass suggestion and hysteria (e.g. the Orson Wells case)
- (3) Hoaxes and publicity seeking persons
- (4) Psychopathic persons, *Crucifix, Jesus, etc.*

In December 1949, these findings were released to the public by the Department of Defense, and were given wide comment and circulation by the Press.

From February 1949 to mid-1951, the project was carried on a low-priority basis. In late 1951, there was suddenly a renewed public interest and an increase in the number of sightings was reported. A review of the situation made at this time seemed to indicate that this was due to the emphasis placed on UFOs by the Press. In the summer of 1951, the project was reviewed by the Directorate of Intelligence, Hq, USAF, and Project Blue Book was established, with the recommendations that reporting, investigating, and analytical procedures be improved where possible. This was complied with as we shall show later.

The "peak year" in the UFO program was 1952, when a monthly average of over 100 reports per month were received. This compares with approximately 10 per month for 1951. The publicity and fanfare given to the UFO controversy by press, publishers, writers and others reached a high pitch during 1952 and developed a tendency on the part of the public to question the Air Force's handling of the alleged "menace" presented by "flying saucers".

From 1947 to the present time, we have investigated and analyzed thousands of UFO cases of every imaginable variety. During these eight years or so, the Air Force was repeatedly accused of withholding vital "flying saucer" information from the public; that UFO's were Soviet aircraft of such advanced design and fantastic speeds that they could traverse the skies of America and return to Russia in a matter of hours; that they were space-ships manned by super-intelligence beings from another galaxy which were drawn to the earth by the atomic tests set off by the U.S. and Russia; that the UFO's represented the Lord's advance scouts preparatory to the Judgement Day; and, unfortunately, by some people high in influential positions, that they were our own experimental aircraft, which, through some conspiracy in top AF echelons, were purposely allowed to roam our skies at night, calculated to frighten our people into thinking they were Soviet aircraft, in order to procure larger appropriations for the Air Force.

During this trying period - without fanfare, ballyhoo or undue publicity, the Air Technical Intelligence Center went quietly, solemnly and seriously about the business of investigating and

analyzing this large mass of UFO data. As we got deeper into the matter, it was found that ATIC investigators and analysts alone could not do the job of attempting to evaluate and explain this phenomena. Other fields of science were involved. Therefore, we solicited the aid of some of the best scientists and technical people in the country, in the field of astronomy, meteorology, aerodynamics, physics, and yes, psychology, to name a few. For example, the prime UFO scientist-consultant is Dr. Hynek, who is Professor of Astrophysics and Astronomy, Ohio State University, Secretary of the American Astronomical Society, and Director of the IGY Satellite Tracking Program. Other scientific personnel, outside of the Air Force, are utilized on a "as needed" basis. This portion of the project to improve the over-all UFO program was under "Project Stork".

It became apparent that if reporting and investigative procedures could be improved, the percentage of unsolved sightings would decrease. Accordingly, ~~the following procedures were adopted:~~
in late 1952

~~(1)~~ → the 4602d Air Intelligence Services Squadron (Headquarters, Air Defense Command) was directed to carry out all field investigations and preliminary evaluations of UFO sightings. This organization has units deployed throughout the U.S. and they are so highly mobile that they can arrive "on-the-spot" within a very short time after a UFO report is received. This would supply the most important of all factors - timeliness, and would leave ATIC free to perform final analyses and evaluations.

(Slide 1 - Location of 4602d Field Units)

We now had, in our opinion, the best investigative and analytical tools to do the job of identifying or explaining UFOs. Let us see what effect the 4602d and the use of scientists and specialists had on the UFO program.

(Slide 2 - UFO Statistics - 1947 to date)

The drop in both the percentage of "unknowns" as well as the total reports should be noted. As may be noted from this chart, the percentage went from 22% to 13% to 9% and now to approximately 3%. It became apparent as more prompt investigations, and as we acquired more experience in UFO analysis and appraisal procedures, and better utilized the services of scientists, the percentage of "unknowns" would drop. However, notice the sudden rise of UFO reports since early 1956. This is significant and is one of the reasons for this briefing.

EFFECTS OF PUBLICITY:

Before we proceed in the matter concerning the sudden rise of UFO reports, a few words should be devoted to the effects that certain types of publicity has on the UFO Program, which, in turn, can effect both the top people in the Department of Defense, as well as the investigators in some field unit. As an example, within two weeks in July of 1952, radar scopes in the Washington Airport

showed certain unidentified blips. Aircraft were sent up to intercept and identify these objects. They found nothing. The press somehow picked it up. Within a matter of hours, headlines not only in Washington, but in other parts of the country screamed that "flying saucers" were hovering over our capital. The next slide will show you an example of this newspaper sensationalism.

(Slide 3 - "Jets alerted for saucers")

UFO reports in great numbers started pouring in at the Center. Both the Department of the Air Force and ATIC were besieged with demands for explanation or comment. As a result, on 29 July 1952, General Samford held a press conference which was televised nationally. A review of the statements made by both the press and public indicated that General Samford's explanations and assurances that the phenomena were not of interplanetary origin and did not constitute a threat to the United States were not only received with some skepticism generally, but were, in fact, totally rejected by a large number of writers and so-called UFO "experts". As a matter of note, the much publicized "Washington Flying Saucer Sighting", which purported to show flying saucers hovering over the capital, but which were in reality clips on radar scopes created by unusual atmospheric conditions, was a major item of issue during this conference.

The correlation between the type of publicity given to UFO sightings by the press and the publishers, and the effect it has on the number of reports received is shown by this slide.

(Slide 4 - Effects of Publicity on UFO Reports)

Note the effect of the conservative and scientific approach of "Life" and "Look" magazines on UFO reports for that period, in contrast to the newspapers' treatment of the Washington Radar "Flying Saucer" incidents and General Samford's press conference. The New Yorker's "middle-of-the-road" treatment, and its effect on sightings is also interesting to note.

During the last six months, an increase in UFO reports has been noted. In August alone, for example, 125 reports were received by ATIC, the largest number since the peak year of 1952. Of some concern, and paralleling the increase of UFO reports, is the fact that during this time, there has been a great increase in the number of private UFO organizations, as well as books, motion pictures, and TV presentations on this subject.

A year or so ago, there were only a handful of these self-appointed research organizations, dedicated to investigation and analysis of UFO's. As of this date, there are more than forty such organizations of which we have knowledge, and they are increasing monthly.

In early 1955, five books on "flying saucers" were published. To date approximately twenty have been published, and have received wide circulation here and abroad.

There are now six motion pictures in circulation having "flying saucers" as their theme. One motion picture which was released in May of this year, and which is still receiving considerable publicity uses as its main characters former UFO Project Officials and personnel. Its technical advisor is a former UFO Project Officer. The main plot is centered around two colored film strips of so-called "flying saucers". These film strips were previously submitted to the Air Force for examination, and consist primarily of moving spots of light against a blue sky. Our conclusions were that the objects in one film were aircraft and in the other sea gulls. These conclusions were corroborated by an independent study made by the research organization of an aircraft manufacturer of very high standing.

With very few exceptions, both these self-appointed organizations and the books published have been highly critical of the Air Force handling of the UFO matter. They all show a desire to embarrass the Air Force. A number of these private organizations have written directly to President Eisenhower, to General Samford and to members of Congress, requesting or demanding hearings, briefings, or discussions with UFO project officials.

During the last five months, we have prepared detailed letters to Senator Knowland, Senator Byrd, and Representative Moss regarding aspects of the UFO program which have been brought to the attention of these gentlemen by so-called private "UFO specialists".

Although these UFO organizations include some sincere, well-meaning members, our experience in discussions with sponsors of such organizations has shown that any Air Force explanations or statements are either totally unacceptable or are met, at the least, with skepticism. Our explanations and statements are either misinterpreted, misquoted, exaggerated or used out of context, all to the detriment of the Air Force in general, and the Directorate of Intelligence in particular.

UFO OPERATIONS

To give you a little better idea of the project, I would like to tell you how we operate. Air Force Letter 200-2 is the basis for our operations. ^{This AF Regulation} states that the ATIC is responsible for analyzing all reports of unidentified flying objects and that each Air Force unit is responsible for cooperating with the Air Defense Command in the investigation of UFOs and in forwarding reports that they receive to ATIC. It further states that, if possible, all reports will be forwarded by wire then followed up within three days by a written AF Form 112. If AF Form 112's are not available the report can be made in letter form. This reporting requirement does

* Insert: By "our operations" is meant all the units and personnel involved in the UFO program. Therefore, from this point on, it should be understood that the method of operations and preliminary analyses means the 4602nd AHS, as well as ATIC... and is the "meat" of this training lecture.

not mean that the officer receiving the report from the source or the observer does not have the prerogative to make his own evaluation and determine whether or not the sighting is worth forwarding. In fact, we should like to insist on it. He may do this in two ways. He may be able to identify the object, if he does, it is no longer an unidentified flying object, and therefore, does not have to be reported. Secondly, he may evaluate the report according to source and content and determine that it would be of no value as far as a follow-up investigation or analysis is concerned. To break down this last point further, the officer receiving the report or the person investigating may believe the source is of doubtful character or it may be obvious that the source did not make careful observations or that he was unreliable, or trying to perpetrate a hoax. The more observers to a specific sighting, the better. If several people make an observation their estimates can be arranged and the results are a little more accurate. It is a good idea, however, to at least note the name and address or telephone number of such sources since it might be that their observation would tie in with others and it would be necessary to contact them again.

EVALUATING THE SOURCE:

As in all intelligence matters, the source is extremely important. We know psychology is a strong element in this project, although we maintain that almost everyone who reports actually has seen something. At times they unconsciously let their imagination twist the facts. It should be pointed out that, as stated in Project Blue Book's special UFO report, in the majority of cases we are dealing not with facts, but with the observer's impressions or interpretations of the UFO sighted. It is very difficult, if not impossible, to set down any rule to use in evaluating a source. Sometimes you can talk to a person and learn that they are very imaginative. We go a lot on the person's background, age and sex. An airline pilot may see a vapor trail but to a housewife it is a flying saucer, possibly enhanced by the fact that she just read a "flying saucer" story. This does not mean all housewives are poor sources, but categorically, commercial airline pilots are more reliable than housewives simply because they have seen and can identify a larger variety of things in the air and are naturally more prone to be conservative in reports. As field investigators you may encounter what we term "complex sightings". We have recently prepared and disseminated to all 4602d Units, a solution to the problem, and will show it to you at the end of this briefing.

BASIC CHECKS TOWARDS IDENTIFYING UFOs

Balloons:

When you receive a report, the first thing that you should check for is the possibility of its being a balloon, aircraft or astronomical body because these three objects give us the most trouble. We also go through this same procedure as part of our analysis of your report. To go into each of them a little more specifically, we will start with balloons.

There are two different general categories of balloons. One is the research type. These balloons vary in size, shape and are released from various points in the U.S. depending upon what projects are being conducted and are not launched at any scheduled time. They may be small like weather balloons, there may be clusters of these weather balloons, or they may be large plastic balloons that are 100 feet in diameter. With the present emphasis on cosmic ray study many different types of balloons are being launched, in the U.S. every day.

The other category is the regularly launched weather balloons. These are launched from known locations in the U.S. at definite times. On the regularly scheduled weather balloon launchings, your unit should have data on all launch sites and know the approximate time of launching each day for the area under your jurisdiction. You have the authority to go directly to these stations to obtain data on their balloons or, if the time element is not critical, to go through Air Weather Service to get it from their central files. Fortunately, many of these balloons are tracked optically, by radar, or by radio DF and it is possible to get the exact tracks of the balloons.

If you get a report of an object you believe to be a balloon, check with your weather officer. He will know what stations in your area launch balloons and from the general wind conditions at the time of the sighting tell you where the balloon probably came from. You can then get the plot of balloon tracks and definitely establish whether the object was a balloon. If there are several launch locations in your area, you may have to check them all. Many times a call to the unit launching the balloon will suffice as they can tell you the location of their balloon at a given time.

Balloons do not give us any trouble when they look like balloons, it is when they don't look like balloons that they give us trouble and they can take on many odd appearances. In the daytime a balloon will appear to be a very bright star in the sky. Under ideal conditions, a balloon can be seen as high as 60,000 feet. This depends a great deal on weather conditions. During the daytime a balloon at very high altitude will appear to be stationary or traveling very slowly. At night balloons that are light will appear to be a radically moving light. This light may even appear to change color, due to atmospheric conditions. The balloon will change direction with wind and will appear to be a jerky, zig-zaggy course. At dawn or dusk a balloon can appear to be a fiery red or orange, circular-shaped object in the sky. The reason for this is that the balloon is picking up the slanted rays of the sun, exactly the same as a cloud will pick up the sun's rays in a sunset.

Some balloons carry radar reflectors suspended some distance below the balloon to give a radar return. The clue to this is that they will be traveling with and at the same speed as the wind at their altitude, and may present a weird appearance under some conditions. Let us see why balloons make up a large number of our UFO evaluations.

- (Slide 5 - Balloon locations)
- (Slide 6 - Balloon tracks)
- (Slide 7 - Balloons reported as UFO's)
- (Slide 8 - Weather balloon with radar reflector)
- (Slide 9 - Radar reflectors)

Aircraft:

With the large air traffic criss-crossing the skies over America, day and night, it is difficult to check aircraft. This is because Flight Services and CAA do not keep a permanent record of aircraft flights very long after the aircraft has landed. Therefore, it is up to the officer receiving the report from the observer to thoroughly check aircraft movements immediately. He may check these through the control tower, through Flight Service, through CAA radio stations, radar, or many various ways, but he should check thoroughly, to see whether or not there were any aircraft flights in the area of the sighting. ADC units have a distinct advantage here, because if the report is received soon enough, their radar units can be checked.

(Slide 10 - Canberra in fog)

(Slide 11 - Marianna film scene)

(Slide 12 - Marianna film scene)

Astronomical Bodies:

Many UFO sightings are caused by astronomical bodies. By astronomical bodies we mean bright stars, planets, or meteors. The most valuable information in the analysis of an UFO that is suspected of being an astronomical body is the bearing, the azimuth, angle of elevation, and the time. From this we can check back through almanacs and navigation tables and determine the locations of certain bright stars. Bodies that give us trouble are Mars, Venus, Jupiter, Capella and several others. You should check stars by obtaining the approximate time, azimuth and elevation of the reported object and grabbing the nearest navigator. Remember, however, that the average layman cannot give exact degrees of elevation or bearings.

Meteors are not too difficult to evaluate because they seem to have a standard description. If someone reports an object similar to a rocket going across the sky at high speed, without change of course, zig-zagging or sudden change of altitude, and leaving a trail behind it, chances are it is a meteor. A meteor is seldom observed for more than 10 seconds, horizon to horizon. Six seconds is the average. However, in certain instances we have had very unusual meteors reported. We have found that there are certain classes of meteors that astronomers call fireballs. These are so rare that there is a good chance that you may see only one in your life, if any. Many times these are reported by pilots as missiles. We have had pilots who have complained to the Air Force about shooting rockets, or experimental missiles through the airways and endangering their aircraft. This is a rather illogical statement, when you get to thinking about it. One, if a missile appeared anywhere outside the proving grounds chances are it would be an enemy missile. However, if you have studied missiles you will note that the burning time, or the time before fuel cut-off, is only a relatively short period during the missile's flight. If we would say, hypothetically, a rocket was shot from some foreign country into the U.S., chances are very good that the fuel shut-off point would have come long before the rocket ever reached the U.S. and it would not be emitting a flame or a long trail.

You can check meteors by looking for accounts of them in the newspaper, or consulting local astronomers. This next slide, through the courtesy of our friend Walt Disney, emphasizes the number of meteors hitting our atmosphere every day.

(Slide 13 - Target Earth.

Radar Sightings:

Since ADC has the vast majority of the radar that is operating 24 hours per day, we often receive UFO reports from them. ADC Regulation 200-2 covers such reporting. This regulation states what information is to be forwarded. ADC uses a well designed questionnaire, specifically for radar UFOs.

Although relatively new as a cause of UFO sightings, we are well aware of the fact that certain weather conditions and interference between two radars can cause wierd effects. Our problem is to determine methods of more positively establishing the cause of certain effects and even being able to predict when these effects may take place.

When reporting a radar sighting, the exact weather data are extremely important. Plots of the temperature, pressure and moisture vs. Altitude should always be reported.

Radar Scope Photos:

A large number of ADC radar stations are equipped with special radar scope cameras. ADC Regulation 200-2 authorizes the use of these cameras for photographing abnormal returns. These scope cameras should be ready to operate at all times since scope photos are an absolute necessity for the accurate evaluation of reports involving radar. As intelligence field units, you should insist that they use these cameras whenever they verbally report unidentified blips doing wierd things on their radar scopes.

(Slide 14 thru 21 - Examples of radar scope returns - anamolous propagation)

Other Causes of Reports:

Naturally balloons, aircraft and astronomical bodies do not account for all the sightings. We have a smaller percentage of other things, such as ducks and geese flying over drive-in theaters at night, searchlights on clouds, unusual cloud formations, blimps, pieces of paper caught in an updraft, and many other things that cause reports. These are very difficult to check and to check them we normally go back to old sightings. For example, sometime back, a certain Western city was somewhat disturbed by glowing objects that flew over the city on various nights. Finally, after considerable investigations, interviews and scientific study of the phenomena, it was determined that it was flocks of ducks or geese reflecting the city's newly installed lights. We will take a case like this and file it, both mentally and physically. When we come across a similar report, we will go back and make a comparative

✓

It has been characteristic of many reported observations of unidentified flying objects in the past that they have indicated at least some features of modern aircraft. There have been descriptions including rocket or jet pods, fins or rudders, windows or portholes, propellers, exhausts, etc. High speeds of modern-day aircraft lessen the possibility of detailed observation, and only certain prominent or familiar features of the flying object may stand out in the observer's memory.

BALLOONS

Silvery, transparent, disk-like objects may be balloons. The absence of exhaust or engine noise, or any visible means of propulsion, would support such identification. Weather balloons are often released in clusters and may drift in what appears to be formation, depending on the air currents. They shimmer in reflected sunlight or moonlight, and seem to hover as they pass from one air current to another.

Upper air research balloons may attain great heights and travel great distances before they burst and fall back to earth. They may be observed, therefore, in areas far removed from any logical launching site. Research balloons are usually constructed of material with a highly reflective surface. They often approximate one hundred feet in diameter and are visible, under certain atmospheric conditions, even at extreme heights. Such balloons, seen in reflected light, may seem disk-like in shape and may appear to have an oscillating motion. They carry metallic equipment which can result in electronic contact.

An object usually is not a balloon if its speed is too fast. However, some balloons, such as those used for cosmic research, travel in the upper air currents at speeds often in excess of 100 miles per hour. In identifying a flying object as a balloon, it should be borne in mind that a balloon moves with the wind and not against it.

In the field of technological developments, new giant weather balloons are being launched to fly at 30,000 feet in an effort to learn more about atmospheric pressures, temperatures, wind directions and velocity over vast stretches of open sea. They will travel high above regular air routes and will be rigged to destroy themselves if they drop below 28,000 feet, or fail to go that high. These balloons are 40 feet in diameter and have a plastic skin only 2/1000ths of an inch thick. Flying at great heights over open water, and reflecting sunlight or moonlight from their plastic skin surface, these balloons could easily be mistaken for unidentified flying objects.

ASTRONOMICAL BODIES

The estimated azimuth and elevation of a flying object can be checked to determine the known location of astronomical bodies. Meteors may be identified by conformance to size, shape and maneuvers described in Section 2, "Meteorological and Astronomical

PROJECT BLUE BOOK SPECIAL UFO REPORT:

At this point in the briefing, a number of you probably may feel that we are strongly anti-saucer, ~~or~~ that our findings were not scientific, objective or conclusive. To assure both ourselves, and the people of the United States who we have sworn to protect, we undertook another step towards this end.

In May of 1955, a large panel of distinguished scientists, under the monitorship of Project White Stork, produced a very extensive study, the Project Blue Book Report Nr. 14, entitled, "Analysis of Reports of Unidentified Aerial Objects". This report represented the critical analysis of every UFO report submitted to the Air Force since 1947. In October 1955, this report was declassified by the Secretary of the Air Force, and a public release of the summary of this study was made by the Department of Defense a few days later.

The conclusions of this study, which covered almost 8 years of UFO sightings, were that:

(1) There is a total lack of evidence that these unknowns were inimical or hostile

(2) There is a total lack of evidence that these unknowns were interplanetary space ships.

(3) There is a total lack of evidence that these unknowns represented technological developments or principles outside the range of our present-day scientific knowledge.

(4) There is a total lack of evidence that these unknowns were a threat to the security of the country.

Further, there was a total lack of any physical or material evidence - - not a piece - scrap - or a minute fragment - of these so-called "flying saucers" was ever found. As emphasized by the Project Blue Book Report, it is our belief that if more immediate, detailed, objective observational data could have been obtained on the "unknowns" -- these, too, would have been satisfactorily explained.

In conclusion, I should like to emphasize that regardless how low the percentage of "unknowns" may reach; regardless how well we may perfect our investigative and analytical procedures; and regardless how adept we may become in explaining UFOs, we must, in fact, investigate and analyze every reported incident. Even if a fool-proof system of identifying all aerial phenomena was developed we must remain on the alert. We do not know what developments may take place in the future. That is our part of our Air Force mission.

Thank you.

(At this point - "Bluebook" Special Reports Nr. 14, will be passed among the class for group discussion.)

Prepared by Capt. G.T. Gregory
within a 12 hour period.
Subject to review and
revision as necessary.

EXAMPLES OF " HAND-OUT " MATERIAL

TO BE GIVEN TO THE

ATI SCHOOL STUDENTS FOR STUDY

AND DISCUSSION

(UNCLASSIFIED)

INTELLIGENCE

Unidentified Flying Objects Reporting (Short Title: UFOB)

	Paragraph
Purpose and Scope.....	1
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1. Purpose and Scope. This Regulation establishes procedures for reporting information and evidence pertaining to unidentified flying objects and sets forth the responsibility of Air Force activities in this regard. It applies to all Air Force activities.

2. Definitions:

a. *Unidentified Flying Objects (UFOB)*—Relates to any airborne object which by performance, aerodynamic characteristics, or unusual features does not conform to any presently known aircraft or missile type, or which cannot be positively identified as a familiar object.

b. *Familiar Objects*—Include balloons, astronomical bodies, birds, and so forth.

3. Objectives. Air Force interest in unidentified flying objects is twofold: First as a possible threat to the security of the United States and its forces, and secondly, to determine technical aspects involved.

a. *Air Defense.* To date, the flying objects reported have imposed no threat to the security of the United States and its Possessions. However, the possibility that new air vehicles, hostile aircraft or missiles may first be regarded as flying objects by the initial observer is real. This requires that sightings be reported rapidly and as completely as information permits.

b. *Technical.* Analysis thus far has failed to provide a satisfactory explanation for a number of sightings reported. The Air Force will continue to collect and analyze reports until all sightings can be satisfactorily explained, bearing in mind that:

- (1) To measure scientific advances, the Air Force must be informed on experimentation and development of new air vehicles.

- (2) The possibility exists that an air vehicle of revolutionary configuration may be developed.

- (3) The reporting of all pertinent factors will have a direct bearing on the success of the technical analysis.

4. Responsibility:

a. *Reporting.* Commanders of Air Force activities will report all information and evidence that may come to their attention, including that received from adjacent commands of the other services and from civilians.

b. *Investigation.* Air Defense Command will conduct all field investigations within the ZI, to determine the identity of any UFOB.

c. *Analysis.* The Air Technical Intelligence Center (ATIC), Wright-Patterson Air Force Base, Ohio, will analyze and evaluate: All information and evidence reported within the ZI after the Air Defense Command has exhausted all efforts to identify the UFOB; and all information and evidence collected in overseas areas.

d. *Cooperation.* All activities will cooperate with Air Defense Command representatives to insure the economical and prompt success of an investigation, including the furnishing of air and ground transportation, when feasible.

5. Guidance. The thoroughness and quality of a report or investigation into incidents of unidentified flying objects are limited only by the resourcefulness and imagination of the person responsible for preparing the report. Guidance set forth below is based on experience and has been found helpful in evaluating incidents:

a. Theodolite measurements of changes of azimuth and elevation and angular size.

b. Interception, identification, or air search

*This Regulation supersedes AFR 200-2, 26 August 1953, including Change 200-2A, 2 November 1953.

action. These actions may be taken if appropriate and within the scope of existing air defense regulations.

c. Contact with local aircraft control and warning (AC&W) units, ground observation corps (GOC) posts and filter centers, pilots and crews of aircraft aloft at the time and place of sighting whenever feasible, and any other persons or organizations which may have factual data bearing on the UFOB or may be able to offer corroborating evidence, electronic or otherwise.

d. Consultation with military or civilian weather forecasters to obtain data on: Tracks of weather balloons released in the area, since these often are responsible for sightings; and any unusual meteorological activity which may have a bearing on the UFOB.

e. Consultation with astronomers in the area to determine whether any astronomical body or phenomenon would account for or have a bearing on the observation.

f. Contact with military and civilian tower operators, air operations offices, and so forth, to determine whether the sighting could be the result of misidentification of known aircraft.

g. Contact with persons who might have knowledge of experimental aircraft of unusual configuration, rocket and guided missile firings, and so forth, in the area.

6. ZI Collection. The Air Defense Command has a direct interest in the facts pertaining to UFOB's reported within the ZI and has, in the 4602d Air Intelligence Service Squadron (AISS), the capability to investigate these reports. The 4602d AISS is composed of specialists trained for field collection and investigation of matters of air intelligence interest which occur within the ZI. This squadron is highly mobile and deployed throughout the ZI as follows: Flights are attached to air defense divisions, detachments are attached to each of the defense forces, and the squadron headquarters is located at Peterson Field, Colorado, adjacent to Headquarters, Air Defense Command. Air Force activities, therefore, should establish and maintain liaison with the nearest element of this squadron. This can be accomplished by contacting the appropriate echelon of the Air Defense Command as outlined above.

a. All Air Force activities are authorized to conduct such preliminary investigation as may be required for reporting purposes; however, investigations should not be carried beyond this point, unless such action is requested by the 4602d AISS.

b. On occasions—after initial reports are

submitted—additional data is required which can be developed more economically by the nearest Air Force activity, such as: narrative statements, sketches, marked maps, charts, and so forth. Under such circumstances, appropriate commanders will be contacted by the 4602d AISS.

c. Direct communication between echelons of the 4602d AISS and Air Force activities is authorized.

7. Reporting. All information relating to UFOB's will be reported promptly. The method (electrical or written) and priority of dispatch will be selected in accordance with the apparent intelligence value of the information. In most instances, reports will be made by electrical means: Information over 24 hours old will be given a "deferred" precedence. Reports over 3 days old will be made by written report prepared on AF Form 112, Air Intelligence Information Report, and AF Form 112a, Supplement to AF Form 112.

a. *Addressees:*

(1) *Electrical Reports.* All electrical reports will be multiple addressed to:

- (a) Commander, Air Defense Command, Ent Air Force Base, Colorado Springs, Colorado.
- (b) Nearest Air Division (Defense). (For ZI only.)
- (c) Commander, Air Technical Intelligence Center, Wright-Patterson Air Force Base, Ohio.
- (d) Director of Intelligence, Headquarters USAF, Washington 25, D. C.

(2) *Written Reports:*

- (a) Within the ZI, reports will be submitted direct to the Air Defense Command. Air Defense Command will reproduce the report and distribute it to interested ZI intelligence agencies. The original report together with notation of the distribution effected then will be forwarded to the Director of Intelligence, Headquarters USAF, Washington 25, D. C.
- (b) Outside the ZI, reports will be submitted direct to Director of Intelligence, Headquarters USAF, Washington 25, D. C. as prescribed in "Intelligence Collection Instructions" (ICI), June 1954.

b. *Short Title.* "UFOB" will appear at the beginning of the text of electrical messages and in the subject of written reports.

c. *Negative Data.* The word "negative"

in reply to any numbered item of the report format will indicate that all logical leads were developed without success. The phrase "not applicable" (N/A) will indicate that the question does not apply to the sighting being investigated.

d. *Report Format.* Reports will include the following numbered items:

- (1) Description of the object(s):
 - (a) Shape.
 - (b) Size compared to a known object (use one of the following terms: Head of a pin, pea, dime, nickel, quarter, half dollar, silver dollar, baseball, grapefruit, or basketball) held in the hand at about arms length.
 - (c) Color.
 - (d) Number.
 - (e) Formation, if more than one.
 - (f) Any discernible features or details.
 - (g) Tail, trail, or exhaust, including size of same compared to size of object(s).
 - (h) Sound. If heard, describe sound.
 - (i) Other pertinent or unusual features.
- (2) Description of course of object(s):
 - (a) What first called the attention of observer(s) to the object(s)?
 - (b) Angle of elevation and azimuth of the object(s) when first observed.
 - (c) Angle of elevation and azimuth of object(s) upon disappearance.
 - (d) Description of flight path and maneuvers of object(s).
 - (e) Manner of disappearance of object(s).
 - (f) Length of time in sight.
- (3) Manner of observation:
 - (a) Use one or any combination of the following items: Ground-visual, ground-electronic, air-electronic. (If electronic, specify type of radar.)
 - (b) Statement as to optical aids (telescopes, binoculars, and so forth) used and description thereof.
 - (c) If the sighting is made while airborne, give type aircraft, identification number, altitude, heading, speed, and home station.
- (4) Time and date of sighting:
 - (a) Zulu time-date group of sighting.
 - (b) Light conditions (use one of the following terms): Night, day, dawn, dusk.

- (5) Locations of observer(s). Exact latitude and longitude of each observer, or Georef position, or position with reference to a known landmark.
- (6) Identifying information of all observer(s):
 - (a) Civilian—Name, age, mailing address, occupation.
 - (b) Military—Name, grade, organization, duty, and estimate of reliability.
- (7) Weather and winds-aloft conditions at time and place of sightings:
 - (a) Observer(s) account of weather conditions.
 - (b) Report from nearest AWS or U. S. Weather Bureau Office of wind direction and velocity in degrees and knots at surface, 6,000', 10,000', 16,000', 20,000', 30,000', 50,000', and 80,000', if available.
 - (c) Ceiling.
 - (d) Visibility.
 - (e) Amount of cloud cover.
 - (f) Thunderstorms in area and quadrant in which located.
- (8) Any other unusual activity or condition, meteorological, astronomical, or otherwise, which might account for the sighting.
- (9) Interception or identification action taken (such action may be taken whenever feasible, complying with existing air defense directives).
- (10) Location of any air traffic in the area at time of sighting.
- (11) Position title and comments of the preparing officer, including his preliminary analysis of the possible cause of the sighting(s).
- (12) Existence of physical evidence, such as materials and photographs.

e. *Security.* Reports should be unclassified unless inclusion of data required by d above necessitates a higher classification.

8. Evidence. The existence of physical evidence (photographs or materiel) will be promptly reported.

a. *Photographic:*

- (1) *Visual.* The negative and two prints will be forwarded, all original film, including wherever possible both prints and negatives, will be titled or otherwise properly identified as to place, time, and date of the incident

(see "Intelligence Collection Instructions" (ICI), June 1954).

- (2) **Radar.** Two copies of each print will be forwarded. Prints of radarscope photography will be titled in accordance with AFR 95-7 and forwarded in compliance with AFR 95-6.

b. **Materiel.** Suspected or actual items of materiel which come into possession of any Air Force echelon will be safeguarded in such manner as to prevent any defacing or alteration which might reduce its value for intelligence examination and analysis.

BY ORDER OF THE SECRETARY OF THE AIR FORCE:

OFFICIAL:

K. E. THIEBAUD
Colonel, USAF
Air Adjutant General

DISTRIBUTION:

S; X:

ONI, Department of the Navy 200
G-2, Department of the Army 10

9. Release of Facts. Headquarters USAF will release summaries of evaluated data which will inform the public on this subject. In response to local inquiries, it is permissible to inform news media representatives on UFOB's when the object is positively identified as a familiar object (see paragraph 2b), except that the following type of data warrants protection and should not be revealed: Names of principles, intercept and investigation procedures, and classified radar data. For those objects which are not explainable, only the fact that ATIC will analyze the data is worthy of release, due to the many unknowns involved.

N. F. TWINING

Chief of Staff, United States Air Force

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DRAFT

HEADQUARTERS 4602D AISS
Ent Air Force Base
Colorado Springs, Colorado

GUIDE TO IDENTIFICATION

Unidentified Flying Objects

	Paragraph
Purpose - - - - -	1
Definitions - - - - -	2
Objective - - - - -	3
Guidance - - - - -	4
Identification Criteria - - - - -	Inclosure

1. PURPOSE: This publication is designed for the use of Ground Observer Corps personnel and is published to familiarize observers with common phenomena which are sometimes misinterpreted as Unidentified Flying Objects (UFOB's).

2. DEFINITIONS:

a. Unidentified Flying Object (UFOB)-- Relates to any airborne object which by performance, aerodynamic characteristics, or unusual features does not conform to any presently known aircraft or missile type, or which cannot be positively identified as a familiar object.

b. Familiar Objects-- Include balloons, astronomical bodies, birds, etc.

3. OBJECTIVE: Due to the prolonged observation of the sky during both daylight and night time hours, familiar objects such as meteors, aircraft, balloons, astronomical bodies, searchlights, birds, etc., will be frequently observed by GOC personnel. Due to atmospheric conditions (temperature inversions, dust, clouds, etc.), reflections, sound (or

3. OBJECTIVE (Contd):

lack of sound), speed, position, etc., common phenomena may sometimes be misinterpreted as UFOB's. It is highly desirable that all UFO phenomena be identified or explained. In this respect, the observer requires some "rule-of-thumb" to assist him in this identification.

The object of this publication is to familiarize the Ground Observer with the appearance(s) of common objects under one or more of the circumstances listed above.

4. GUIDANCE: Attached is a list of common phenomena to which Ground Observers may be exposed during their tours of duty. It is recommended that you become thoroughly familiar with these criteria, as they may enable you to identify objects with a greater degree of accuracy.

BALLOONS

1. Shape: Round, cigar, pinpoint, or bowling pin.
2. Size: Balloons up to a hundred feet will generally appear from pinpoint to size of a pea held at armlength.
3. Color: Silver, white or many tints. It may possibly appear dark as when projected against the clouds. Sometimes transparent.
4. Speed: Large scale erratic speed ruled out. In general hovering to slow apparent speed.
5. Formation: Single to cluster.
6. Trail: None.
7. Sound: None
8. Course: Straight with a general gradual ascent, unless falling.
9. Time in Sight: Generally long. Note: Balloon may suddenly burst and disappear. *This may give the impression that it disappeared out of sight with a tremendous burst of speed.*
10. Lighting Conditions: Night or day but especially at sunset or sunrise.



What may appear to be an unfamiliar flying object soaring through the sky may actually be something tangible, such as this artist's concept of a large weather research balloon.

ical Aspects." During the month of March, the planet Venus is low on the horizon and is extremely bright. It can appear to change color and perform erratic maneuvers when viewed through thin clouds or haze. Meteors, on the other hand, do not pursue an erratic course. When the duration of observation of a flying object is extremely short, it is highly probable that the object is an astronomical sighting.

SHAPE

Shape is an important factor in determining the identity of a flying object. Distortion of shape, due to distance and darkness, enhances the difficulty of identification. Many of the strange shapes reported in the past would appear to be unidentifiable in terms of familiar objects, but in many instances could have been reflections from conventional objects viewed under unusual conditions. Light and shadow produce fantastic distortions, especially when objects are viewed at great distances and in varying degrees of gathering darkness.

An unidentified flying object may assume various shapes. The four most common shapes reported in the past are:

- (1) Elliptical or disk shape.
- (2) Aircraft shape.
- (3) Cigar shape.
- (4) Propeller shape.

AIRCRAFT

1. Shape: From conventional to circular or elliptical.
2. Size: Pinpoint to actual.
3. Color: Silver to bright yellow (night - black or color of lights).
Jet exhaust yellow to red. Under certain conditions aircraft too far distant to be visible to the naked eye, will reflect sunlight from wings or fuselage.
4. Speed: Generally only angular speeds can be observed. This depends on distance but small objects crossing major portion of sky in less than a minute can be ruled out. Aircraft will not cross major portion of sky in less than a minute whereas a meteor certainly will.
5. Formation: Two to twenty. Numbers greater than 20 more likely birds than aircraft.
6. Trails: May or may not have (vapor and exhaust).
7. Sound: Zero to loud shrill or low depending on altitude and winds aloft. Under certain conditions, aircraft may be observed at high altitudes, without making any sound.
8. Course: Steady, straight or gently curving (not erratic - may appear still if approaching head-on). Right angle turns and sudden reversals, abrupt changes in altitude ruled out.
9. Time in Sight: More than 15 seconds, generally of the order of a minute or two.
10. Lighting Conditions: Night or Day.

METEOR

1. Shape: Round to elongated.
2. Size: Pinpoint to size of moon.
3. Color: Flaming yellow with red, green or blue possible.
4. Speed: Crosses large portion of sky in few seconds except if coming head-on.
5. Formation: Generally single - can break into shower at end of trajectory. Occasionally (but rare) small groups.
6. Trail: At night almost always a luminous train which can persist as long as a half hour (rarely). Daytime meteors are much less frequently observed. In daytime, leaves a whitish to dark smoke trail.
7. Sound: None
8. Course: Generally streaking downward, but not necessarily sharply downward. Can on rare occasion give impression of slight rise.
9. Time In Sight: Longest reported about 30 seconds, generally less than 10.
10. Lighting Conditions: Day or Night. Mostly night.
11. Other: An exceptionally bright meteor is called a fireball. These are rare but extremely spectacular and on occasion have been known to light surroundings to the brightness of daylight.

STARS OR PLANETS

GENERAL

The planets, Venus, Mars, Jupiter, and Saturn are generally brighter than any star, but they twinkle very much less (unless very close to horizon). Stars twinkle a great deal and when near the horizon can give impression of flashing light in many colors.

1. Shape: Pinpoint - starlike.
2. Size: Never appreciable.
3. Color: Yellow with rainbow variations.
4. Speed: Stars apparent speeds carry them from east to west in the course of the night but they are often reported as erratic. The effect is psychological, most people being unable to consider a point as being stationary. Occasionally turbulence in the upper atmosphere can cause a star to appear to jump (rare) but somehow twinkling gives the impression of movement to many people.
5. Formation: There are no clusters of very bright stars but faint stars are grouped in their familiar constellations.
Note: A report of 4 or 5 bright clustering lights would rule out stars.
6. Trail: None.
7. Sound: None.
8. Course: Always describe 24 hour circle around pole or sky from east to west.
9. Time In Sight: When clear, stars are always visible. Most stars rise or set during the course of the night. Stars low in western

SEARCHLIGHTS

1. Shape: Round to elliptical.
2. Size: Pea at arms length to large luminous glow, dependent upon cloud height.
3. Color: White fluorescent.
4. Speed: Stationary to fantastic.
5. Formation: Usually only one but occasionally two or three.
6. Trail: None
7. Sound: None
8. Course: Circling, straight, stationary or erratic. Note:
Scattered clouds can give impression of object
disappearing and reappearing in a different portion
of the sky in a few seconds.
9. Time in Sight: Generally long.
10. Lighting Conditions: Night

OPTICAL PHENOMENA

GENERAL

This can cover a multitude of things.

Optical phenomena which have been reported as UFOBs run from reflections on clouds and layers of ice crystals (sundogs) to the many types of mirages. No one set of optical phenomena can be set down as representation for the whole class.

There is no limit to the speed of optical phenomena. Reflections can travel from incredible speed, as in the case of a search-beacon on high clouds to stationary.

1. Shape: Generally round but can be elliptical or linear.
2. Size: Starlike to large luminous glow.
3. Color: Generally yellow
4. Speed: Stationary to fantastic.
5. Formation: Any.
6. Trail: None.
7. Sound: None.
8. Course: Any.
9. Time In Sight: Any.
10. Lighting Conditions: Day and night.
11. Other: One of the standard types is the "sundog". In this a large luminous halo is seen around the sun with one to four images of the sun placed along the halo circle at intervals of 90 degrees. Another report often has to do with a bright planet or even the moon shining through a light overcast. Mirages reflections are said to occur frequently when temperature inversions exists in the atmosphere.

sky set within an hour or two. Stars in east, always
go higher in sky.

10. Lighting Condition: Night - Twilight.

U. S. AIR FORCE TECHNICAL INFORMATION SHEET

This questionnaire has been prepared so that you can give the U. S. Air Force as much information as possible concerning the unidentified aerial phenomenon that you have observed. Please try to answer as many questions as you possibly can. The information that you give will be used for research purposes, and will be regarded as confidential material. Your name will not be used in connection with any statements, conclusions, or publications without your permission. We request this personal information so that, if it is deemed necessary, we may contact you for further details.

1. When did you see the object?

____ Day ____ Month ____ Year

2. Time of day: ____ Hour ____ Minutes

(Circle One): A.M. or P.M.

3. Time zone:

(Circle One): a. Eastern
b. Central
c. Mountain
d. Pacific
e. Other _____

(Circle One): a. Daylight Saving
b. Standard

4. Where were you when you saw the object?

____ Nearest Postal Address ____ City or Town ____ State or Country

Additional remarks: _____

5. Estimate how long you saw the object. ____ Hours ____ Minutes ____ Seconds

5.1 Circle one of the following to indicate how certain you are of your answer to Question 5.

a. Certain c. Not very sure
b. Fairly certain d. Just a guess

6. What was the condition of the sky?

(Circle One): a. Bright daylight d. Just a trace of daylight
b. Dull daylight e. No trace of daylight
c. Bright twilight f. Don't remember

7. IF you saw the object during DAYLIGHT, TWILIGHT, or DAWN, where was the SUN located as you looked at the object?

(Circle One): a. In front of you d. To your left
b. In back of you e. Overhead
c. To your right f. Don't remember

8. IF you saw the object, at NIGHT, TWILIGHT, or DAWN, what did you notice concerning the STARS and MOON?

8.1 STARS (Circle One):

- a. None
- b. A few
- c. Many
- d. Don't remember

8.2 MOON (Circle One):

- a. Bright moonlight
- b. Dull moonlight
- c. No moonlight — pitch dark
- d. Don't remember

9. Was the object brighter than the background of the sky?

(Circle One):

a. Yes

b. No

c. Don't remember

10. IF It was BRIGHTER THAN the sky background, was the brightness like that of an automobile headlight?:

(Circle One) a. A mile or more away (a distant car)?

b. Several blocks away?

c. A block away?

d. Several yards away?

e. Other

11. Did the object:

(Circle One for each question)

a. Appear to stand still at any time?	Yes	No	Don't Know
b. Suddenly speed up and rush away at any time?	Yes	No	Don't Know
c. Break up into parts or explode?	Yes	No	Don't Know
d. Give off smoke?	Yes	No	Don't Know
e. Change brightness?	Yes	No	Don't Know
f. Change shape?	Yes	No	Don't Know
g. Flicker, throb, or pulsate?	Yes	No	Don't Know

12. Did the object move behind something at anytime, particularly a cloud?

(Circle One): Yes No Don't Know.
it moved behind: _____

IF you answered YES, then tell what

13. Did the object move in front of something at anytime, particularly a cloud?

(Circle One): Yes No Don't Know.
it moved in front of: _____

IF you answered YES, then tell what

14. Did the object appear: (Circle One): a. Solid? b. Transparent? c. Don't Know.

15. Did you observe the object through any of the following?

a. Eyeglasses	Yes	No	e. Binoculars	Yes	No
b. Sun glasses	Yes	No	f. Telescope	Yes	No
c. Windshield	Yes	No	g. Theodolite	Yes	No
d. Window glass	Yes	No	h. Other _____		

16. Tell in a few words the following things about the object.

a. Sound _____

b. Color _____

17. Draw a picture that will show the shape of the object or objects. Label and include in your sketch any details of the object that you saw such as wings, protrusions, etc., and especially exhaust trails or vapor trails. Place an arrow beside the drawing to show the direction the object was moving.

18. The edges of the object were:

- (Circle One):
- a. Fuzzy or blurred
 - b. Like a bright star
 - c. Sharply outlined
 - d. Don't remember

e. Other _____

19. IF there was MORE THAN ONE object, then how many were there? _____.
Draw a picture of how they were arranged, and put an arrow to show the direction that they were traveling.

20. Draw a picture that will show the motion that the object or objects made. Place an "A" at the beginning of the path, a "B" at the end of the path, and show any changes in direction during the course.

21. IF POSSIBLE, try to guess or estimate what the real size of the object was in its longest dimension.
_____ feet.

22. How large did the object or objects appear as compared with one of the following objects *held in the hand* and at about arm's length?

(Circle One):

- a. Head of a pin
- b. Pea
- c. Dime
- d. Nickel
- e. Quarter
- f. Half dollar

- g. Silver dollar
- h. Baseball
- i. Grapefruit
- j. Basketball
- k. Other _____

22.1 (Circle One of the following to indicate how certain you are of your answer to Question 22.

- a. Certain
- b. Fairly certain
- c. Not very sure
- d. Uncertain

23. How did the object or objects disappear from view? _____

24. In order that you can give as clear a picture as possible of what you saw, we would like for you to imagine that you could construct the object that you saw. Of what type material would you make it? How large would it be, and what shape would it have? Describe in your own words a common object or objects which when placed up in the sky would give the same appearance as the object which you saw.

This variety of shapes is an indication of individual reaction to what may have been familiar or conventional objects seen under unusual conditions, or created in the mind of the observer by his physiological limitations and psychological responses. Fatigue, unusual weather conditions, and the stress of flying at great speeds and high altitudes could induce such manifestations.

One report of an unidentified flying object stated that it was shaped like a conventional aircraft, but was luminous and surrounded by a red glow. This phenomenon could have been an actual aircraft reflecting light from some undetected source within or on the aircraft and glowing from an unusual play of moonlight or starlight on metal parts.

A disk-like object, with illuminated portholes, could be a conventional aircraft distorted in shape and stripped of wings by a temperature inversion mirage effect and reflecting light through apparently dual and convergent sets of windows.

Transparent, cigar-shaped objects, illuminated from the inside and emitting an exhaust, could be jet aircraft at high altitudes where they appear wingless. The mirage effect of a temperature inversion could cause the apparent illumination and transparency.

Saucer-shaped objects, which hover and maneuver erratically, could be the planets Venus or Mars seen near the horizon at certain times of the year. When objects are viewed through haze or mist, the limitations of the human eye can produce what appears to be a hovering effect, or erratic movement.

Propeller-shaped objects could be conventional or glider-type aircraft, distorted in shape by mirage effects caused by a temperature inversion.

RADAR SIGHTINGS

Radar sightings of flying objects frequently may be explained as ground targets reflected by temperature-inversion layer, or as radar echoes of various objects, not all of which are visible to the human eye. Most solid objects produce radar responses which are recognizable. Moving objects, such as aircraft and birds, normally can be identified by the size of the radar blip and by the speed, altitude, and type of movement measured by the radar set. The radar operator should be able to determine whether the responses noted on his scope are real, or are caused by the weather or other phenomena. A blurred effect on the radarscope may indicate a weather target, whereas a solid target, such as an aircraft, will be sharply defined.

25. Where were you located when you saw the object?
(Circle One):

- a. Inside a building
- b. In a car
- c. Outdoors
- d. In an airplane
- e. At sea
- f. Other _____

26. Were you (Circle One)

- a. In the business section of a city?
- b. In the residential section of a city?
- c. In open countryside?
- d. Flying near an airfield?
- e. Flying over a city?
- f. Flying over open country?
- g. Other _____

27. What were you doing at the time you saw the object, and how did you happen to notice it?

28. IF you were MOVING IN AN AUTOMOBILE or other vehicle at the time, then complete the following questions:

28.1 What direction were you moving? (Circle One)

- | | | | |
|--------------|--------------|--------------|--------------|
| a. North | c. East | e. South | g. West |
| b. Northeast | d. Southeast | f. Southwest | h. Northwest |

28.2 How fast were you moving? _____ miles per hour.

28.3 Did you stop at any time while you were looking at the object?

(Circle One) Yes No

29. What direction were you looking when you first saw the object? (Circle One)

- | | | | |
|--------------|--------------|--------------|--------------|
| a. North | c. East | e. South | g. West |
| b. Northeast | d. Southeast | f. Southwest | h. Northwest |

30. What direction were you looking when you last saw the object? (Circle One)

- | | | | |
|--------------|--------------|--------------|--------------|
| a. North | c. East | e. South | g. West |
| b. Northeast | d. Southeast | f. Southwest | h. Northwest |

31. If you are familiar with bearing terms (angular direction), try to estimate the number of degrees the object was from true North and also the number of degrees it was upward from the horizon (elevation).

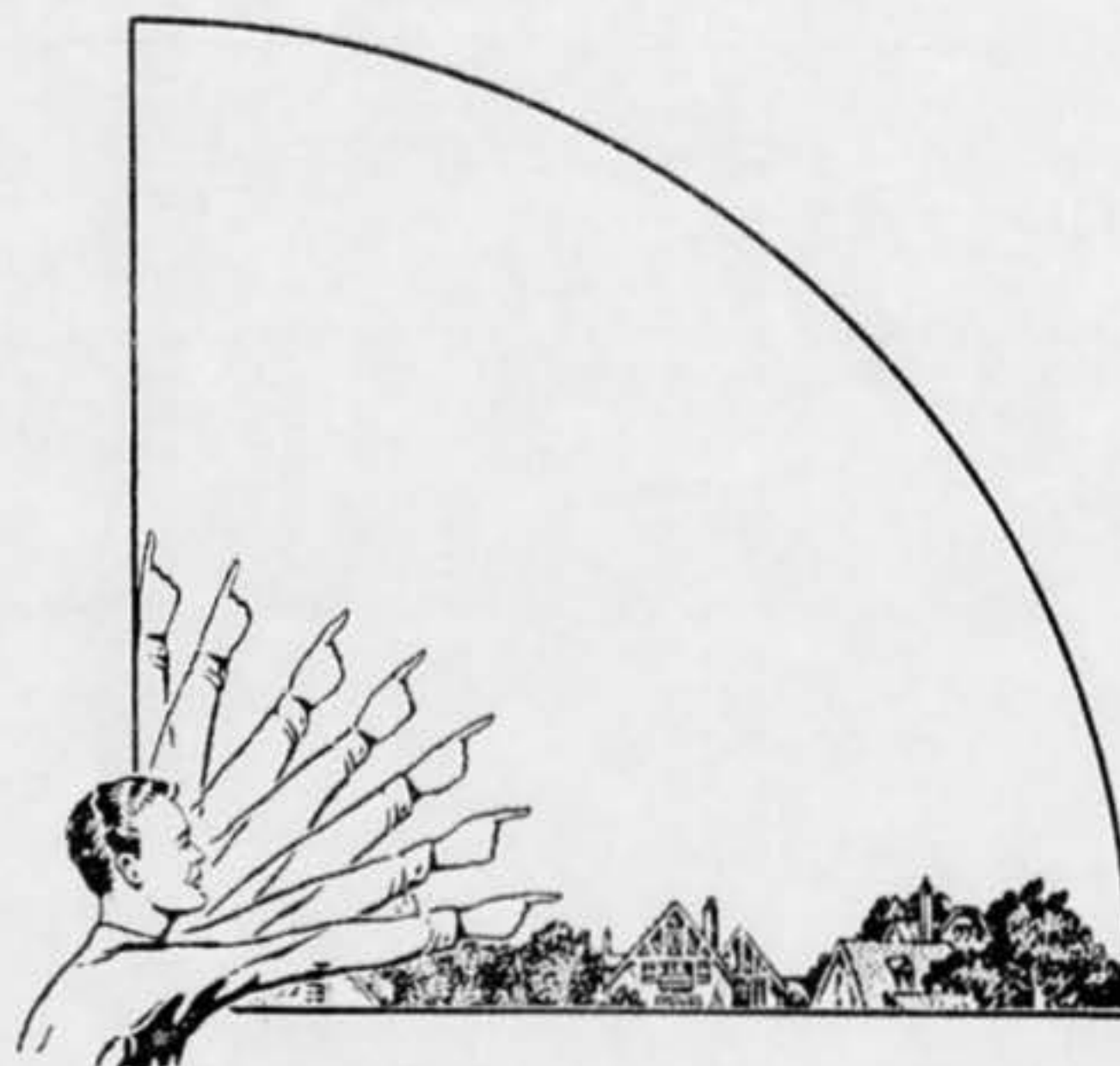
31.1 When it first appeared:

- a. From true North _____ degrees.
- b. From horizon _____ degrees.

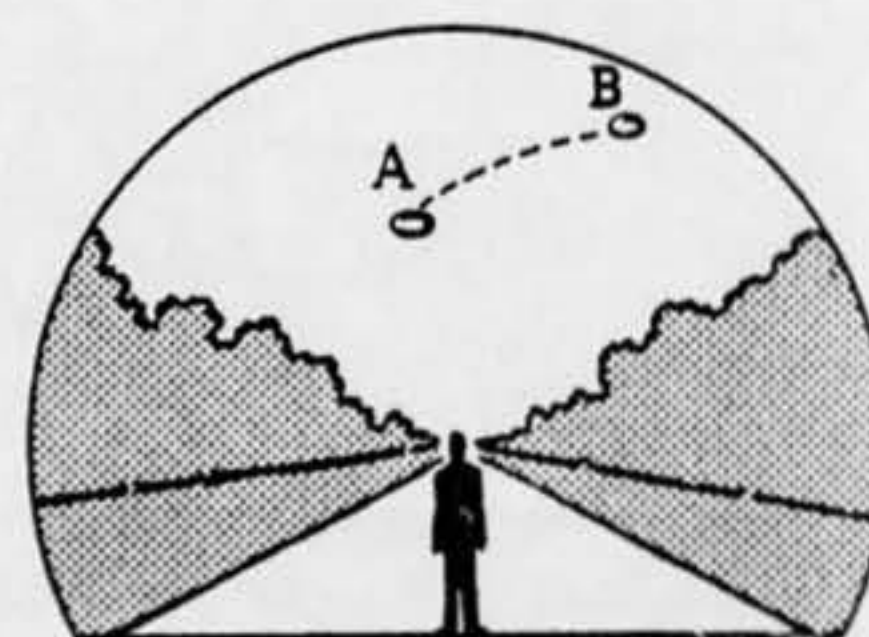
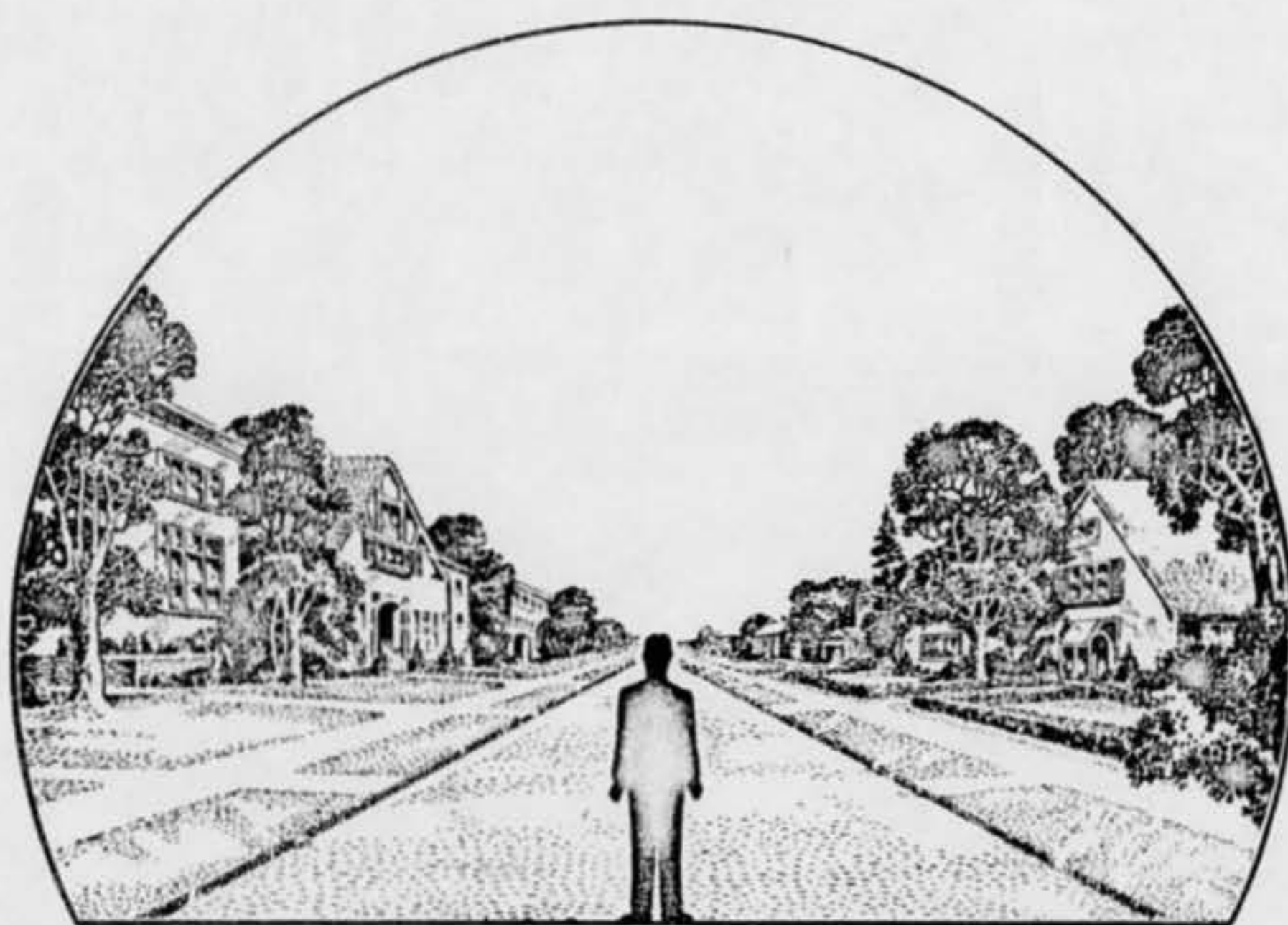
31.2 When it disappeared:

- a. From true North _____ degrees.
- b. From horizon _____ degrees.

32. In the following sketch, imagine that you are at the point shown. Place an "A" on the curved line to show how high the object was above the horizon (skyline) when you *first* saw it. Place a "B" on the *same* curved line to show how high the object was above the horizon (skyline) when you *last* saw it.



33. In the following larger sketch place an "A" at the position the object was when you *first* saw it, and a "B" at its position when you *last* saw it. Refer to smaller sketch as an example of how to complete the larger sketch.



34. What were the weather conditions at the time you saw the object?

34.1 CLOUDS (*Circle One*)

- a. Clear sky
- b. Hazy
- c. Scattered clouds
- d. Thick or heavy clouds
- e. Don't remember

34.2 WIND (*Circle One*)

- a. No wind
- b. Slight breeze
- c. Strong wind
- d. Don't remember

34.3 WEATHER (*Circle One*)

- a. Dry
- b. Fog, mist, or light rain
- c. Moderate or heavy rain
- d. Snow
- e. Don't remember

34.4 TEMPERATURE (*Circle One*)

- a. Cold
- b. Cool
- c. Warm
- d. Hot
- e. Don't remember

35. When did you report to some official that you had seen the object?

_____ Day _____ Month _____ Year

36. Was anyone else with you at the time you saw the object?

(*Circle One*) Yes No

36.1 IF you answered YES, did they see the object too?

(*Circle One*) Yes No

36.2 Please list their names and addresses:

37. Was this the first time that you had seen an object or objects like this?

(*Circle One*) Yes No

37.1 IF you answered NO, then when, where, and under what circumstances did you see other ones?

38. In your opinion what do you think the object was and what might have caused it?

39. Do you think you can estimate the *speed* of the object?

(Circle One) Yes No

IF you answered YES, then what speed would you estimate? _____ m.p.h.

40. Do you think you can estimate how far away from you the object was?

(Circle One) Yes No

IF you answered YES, then how far away would you say it was? _____ feet.

41. Please give the following information about yourself:

NAME _____
Last Name First Name Middle Name

ADDRESS _____
Street City Zone State

TELEPHONE NUMBER _____

What is your present job? _____

Age _____ Sex _____

Please indicate any special educational training that you have had.

a. Grade school _____ e. e. Technical school _____

b. High school _____ (Type) _____

c. College _____ f. Other special training _____

d. Post graduate _____

42. Date you completed this questionnaire:

Day

Month

Year

U. S. AIR FORCE TECHNICAL INFORMATION SHEET
(SUMMARY DATA)

In order that your information may be filed and coded as accurately as possible, please use the following space to write out a short description of the event that you observed. You may repeat information that you have already given in the questionnaire, and add any further comments, statements, or sketches that you believe are important. Try to present the details of the observation in the order in which they occurred. Additional pages of the same size paper may be attached if they are needed.

NAME _____
(Please Print)

SIGNATURE _____

DATE _____

(Do Not Write in This Space)

CODE:

UFO OBSERVERS INSTRUCTION SHEET
(Sky Diagram)

1. GENERAL:

a. The diagram represents all of the sky normally visible to the observer, who is pictured standing under the center of the "dome" of the sky. It is designed to show a three-dimensional view of the area centered around the observer at the time of the UFO sighting.

b. The position of any object in the sky can be described by giving its elevation, or angle upward from the horizon, and its bearing or angle along the horizon, eastward from north.

(1) Illustrations:

- (a) Elevation is 0 degrees for an object on the horizon, and 90 degrees for the point directly over the observer (zenith). Thus, an object half-way up from the horizon to the zenith has an elevation of 45 degrees.
- (b) Bearing (or "azimuth") is the angle along the horizon, starting from north and moving clockwise eastward. Thus, an object directly toward the east, no matter what its elevation is above the horizon, has a bearing of 90 degrees, an object in the south has a bearing of 180 degrees; toward the west, 270 degrees and so on. North is, of course, zero.

EXAMPLE: An object is seen in the northeast and one-third way up from horizon to overhead. Thus, the object has a bearing of 45 degrees, and elevation of 30 degrees. Similarly, an object having a bearing of 180 degrees and an elevation of 60 degrees would be seen directly south and two-thirds of the way up from the horizon.

2. PLOTTING THE COURSE OF AN OBJECT ON THE SKY DIAGRAM:

a. The path of an object across the sky can be shown completely on this diagram simply by connecting with a curved or straight line the various positions the object successively occupies (see example sheet). To aid visualization, the path on the western side of the sky is represented by broken lines; the eastern side in solid lines. Direction of the object is indicated by arrows. The duration of the sighting can be shown by indicating the time at the position, where the object was first and last observed. Where possible, the time at various intermediate positions occupied by the object should also be shown.

b. The diagram can be made a more effective investigative and analytical tool by making the lines (showing the path of the object) thicker or thinner to indicate any varying brightness of the object observed. This is especially valuable when the object appeared only as a moving light at night. Thus, if a light becomes brighter and then gradually fades, it can be represented by a line becoming increasingly thicker and then gradually thinning out to nothing.

c. Use of colored pencils is especially recommended if the object changes color or hue during the sighting.

3. EXAMPLE OF DIAGRAM USE:

*Report 20 July 57 Capt Gregory -
to assist B13's
with complex sightings*

a. Verbal Description of Example Sighting: Object was first sighted in the southeast, about half-way up from the horizon to overhead, at 10:45 PM local time. Its shape or outline was hazy, but appeared round and about the size of a pea (at arm's length) from where observed. It was dim at first but brightened considerably as it got higher in the sky. Its color at this point was bluish white. After about two minutes it crossed to the western part of the sky a little to the north of overhead (zenith) and continued its flight toward the west. At this point its color appeared yellowish white. The light went dim when it got two-thirds of the way to the horizon. It then stopped and hovered for about one minute and then climbed rapidly, going toward the southwest and getting brighter. In less than thirty seconds, it had climbed to an elevation of approximately 60 degrees, and then the light went out abruptly.

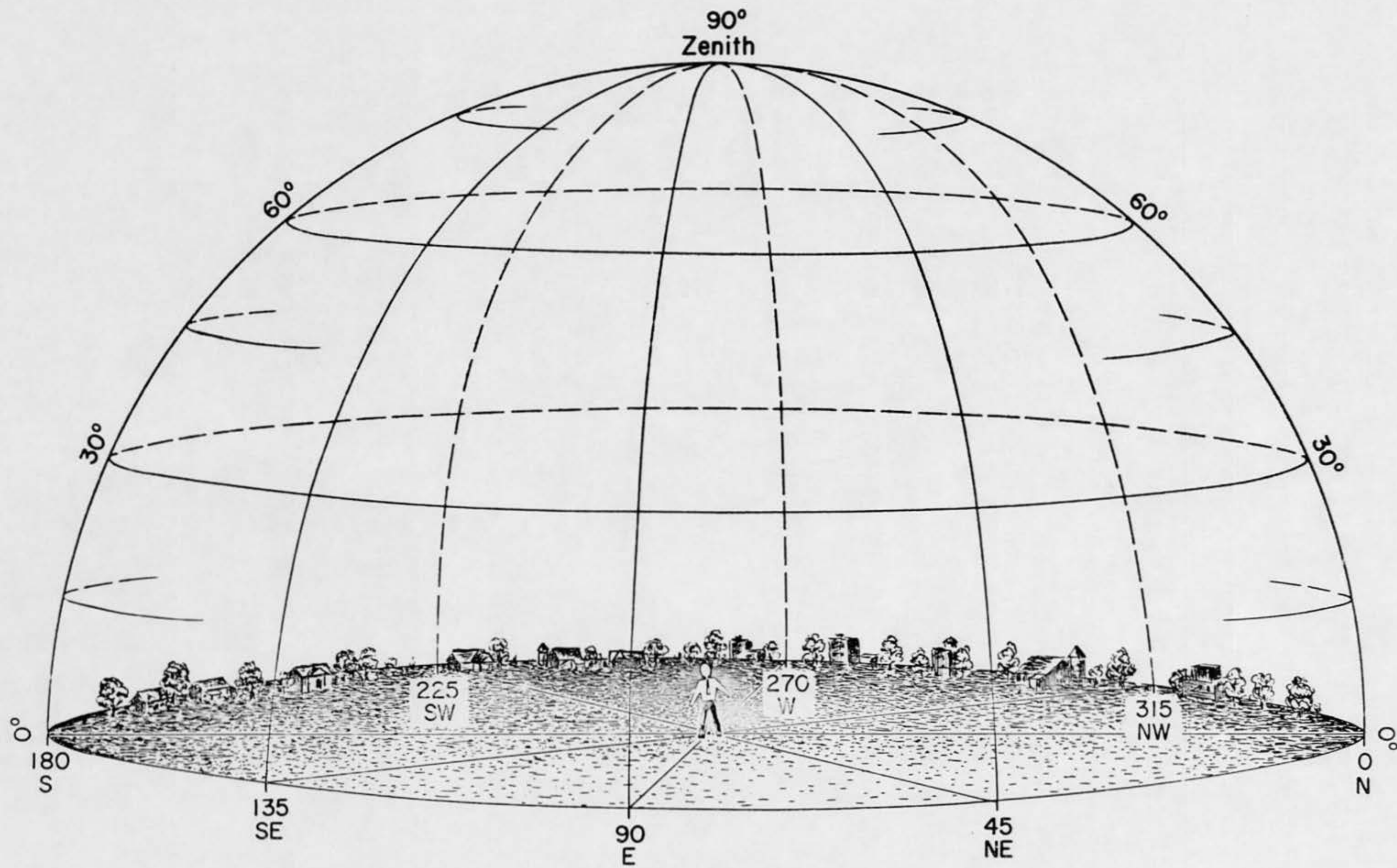
b. Pictorial Description of the Sighting: By referring to the example sheet, notice how simply the above sighting can be portrayed and described, without words, on the example diagram attached here. Note the starting point at bearing 135 degrees (southeast) and elevation 45 degrees (half-way up from the horizon) at 10:45 PM (military time, 2245), and the arrow marking direction of flight. Note also the varying thickness of the line to denote changes in brightness, and the use of the dotted line to indicate its path in the western part of the sky. The "time indications" along the path - 2 minutes to get to the meridian (the north-south overhead line), the hovering for 1 minute, and the ascent in 30 seconds to its complete disappearance, are all shown with a few lines. Thus, the entire sighting can be represented easily on one diagram.

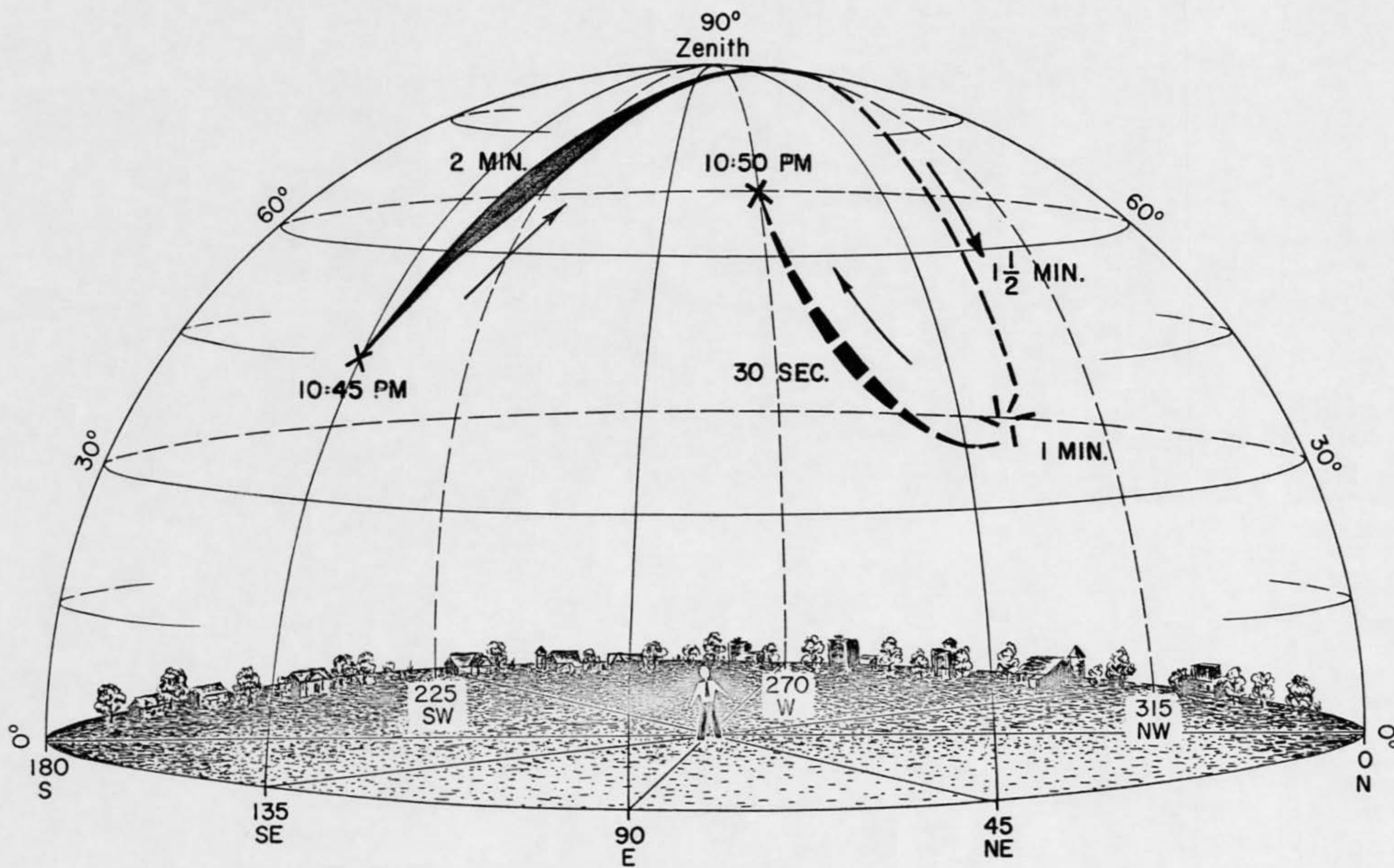
4. FURTHER INSTRUCTIONS AND INFORMATION:

a. Relatively complex trajectories can easily be shown on a diagram of this type. A number of objects sighted can also be indicated, as can any changing formation. The apparent size and shape of the object should be drawn in, preferably by the observer. In the case of an object changing shape or color, this likewise can be drawn in. As previously pointed out, the use of colored pencils to indicate change of color is very desirable.

b. The landscaping in the sky diagram is placed there to help visualization. If any prominent landmarks such as known mountains, buildings, water towers, or specific installations, trees, etc., are part of the sighting area, they should be incorporated into the drawing. These landmarks may later prove to be invaluable as location, plotting or reference points.

c. If you are familiar with the constellations or other heavenly bodies, indicate if possible, the relationship (and movements) of the object with respect to these bodies. This can be sketched on either page 6, item 33 or pages 9-10 of "Summary Data" sheet. Typical examples that can be easily illustrated: "...The object seemed to pass very slowly between the two bottom stars on the handle of the Big Dipper, which was in a vertical position, with the handle pointing down," or "...Object was about the size of a tennis ball -- and remained slightly below and about 15 degrees to the left of the moon."





(EXAMPLE SHEET)

INVESTIGATORS INSTRUCTION SHEET
(Sky Diagram)

A. General:

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2. The position of any object in the sky can be described by giving its elevation, or angle upward from the horizon, and its bearing or angle along the horizon, eastward from north.

3. Illustration: Elevation is 0 degrees for an object on the horizon, and 90 degrees for the point directly over the observer (zenith). Thus, an object half-way up from the horizon to the zenith has an elevation of 45 degrees.

4. Bearing (or "azimuth") is the angle along the horizon, starting from north and moving clockwise eastward. Thus, an object directly toward the east, no matter what its elevation is above the horizon, has a bearing of 90 degrees, an object in the south has a bearing of 180 degrees; toward the west, 270 degrees and so on. North is, of course, zero.

5. Example: An object is seen in the northeast and one-third way up from horizon to overhead. Thus, the object has a bearing of 45 degrees, and elevation of 30 degrees. Similarly, an object having a bearing of 180 degrees and an elevation of 60 degrees would be seen directly south and two-thirds of the way up from the horizon.

B. Plotting the Course of an Object on the Sky Diagram:

1. The path of an object across the sky can be shown completely on this diagram simply by connecting with a curved or straight line the various positions the object successively occupies (see example sheet). To aid visualization, the path on the western side of the sky is represented by broken lines; the eastern side in solid lines. Direction of the object is indicated by arrows. The duration of the sighting can be shown by indicating the time of the position where the object was first and last observed. Where possible, the time at various intermediate positions occupied by the object should also be shown.

2. The diagram can be made a more effective, investigative and analytical tool by making the lines (showing the path of the object) thicker or thinner to indicate any varying brightness of the object observed. This is especially valuable when the object appears only as a moving light at night. Thus, if a light becomes brighter and then gradually fades, it can be represented by a line becoming increasingly thicker and then gradually thinning out to nothing.

3. Use of colored pencils is especially recommended if the object changes color or hue during the sightings.