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FLYING SAUCERS: An Analysis of the AIR FORCE PROJECT BLUE BOOK SPECIAL REPORT NO. 14

by Dr. Leon Davidson

with an appendix consisting of a photo-offset copy of
the full text of the Air Force Project Blue Book
Special Report No. 14, dated May 5, 1955
and some of the important tables and
figures from that report

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Analysis Section
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Publisher's Statement

The letter on page D-3 from Gen. Kinney indicates that the U.S.Air Force has not distributed the full 316-page Project Blue Book Special Report No. 14 because the cost would have been prohibitive. A letter from A.F.Secretary Donald A. Quarles, dated July 5, 1956, states: "It has been estimated that the cost of printing enough copies for distribution to the public through such outlets as libraries and academic institutions would be between $10 and $15 per copy."

This privately financed edition of the Blue Book report is being issued as a public service. Through the careful elimination of the bulk of the tables in the original report, the size has been reduced to about 80 pages, without loss of a single word of the main text. The full Tables of Contents of the original report have been retained, so that the reader may know exactly what has been omitted. The only purpose in the omissions has been to bring the cost down to a reasonable level, so that widespread distribution could be established.

It is guaranteed that there has been no change, alteration, or editing of the material on any page of the Report No. 14 which is reproduced herein. Each page has been reproduced photographically exactly as it is in the original Air Force edition. Every single page of the main text has been reproduced. No part of the text has been omitted.

No author's name appeared on the original edition, and the title page was exactly as shown on page 1 below. Any errors or faults of logic, etc., in the main body of the Report No. 14 are those of the original Air Force author or authors.

The only ways in which the page arrangement of this copy differs from the original Air Force edition are as follows:

[1] The Chi Square tables on pages 62-67 and 70-75 of the original report were arranged one table per page. For economy, these have been placed two per page in this edition.

[2] Page 76 of the original edition has been reproduced in two parts, as pages 43 and 50 (upper page numbers) of this edition, to emphasize the division between sections and avoid split-up of the text by the Chi Square tables.

[3] The case numbers have been written in on the sketches of the twelve "good UNKNOWN SIGHTINGS" (pages 52 to 64 of this edition). The original edition did not put such numbers on the sketches.

[4] The heading at the top of page 69 (this edition) originally accounted for two pages of the report, and was incorporated at the top of page 69 for economy.

Please note: The original report assigned double page numbers to some pages, as is usual Government practise when a blank page follows a printed page. This is the case on page 82 of this edition, which was labeled pages "295 and 296" in the original edition.

D-3

DEPARTMENT OF THE AIR FORCE
WASHINGTON

OFFICE OF THE SECRETARY

15 November 1956

Dear Mr. Davidson:

I know that during the past several months you have had considerable correspondence with the Air Force and the Defense Department regarding Special Report #14, the Air Force Project Blue Book. The intent of this letter is to inform you of our position on the Blue Book as defined by the Secretary of the Air Force.

We distributed a press release and a summary at the time the report was officially released. We made the full report available in the Information Offices of this Headquarters and in the Air Force Information Offices in New York and Los Angeles. The report is still available at these places. We did not distribute the report itself because the cost was prohibitive.

While the Air Force has never denied anyone access to the above-mentioned locations for the purposes of either reading or copying the report, we have not felt justified to expend public funds to assist in commercial reproduction of the report.

I trust this serves to make clear the position of the Air Force.

Sincerely,

A. J. Kinney

ANDREW J. KINNEY
Brigadier General, USAF
Director of Information Services

Mr. Leon Davidson
64 Prospect Street
White Plains, New York

Analysis of the Project Blue Book Report No. 14

by Dr. Leon Davidson

The Blue Book Report No. 14 is reproduced in the pages following this analysis. The press release on page D-5 (which when issued was accompanied by the Summary of the Blue Book Report, pages vii to ix of the original text) gives the background of the Air Force's investigations which led to the writing of Report No. 14 and its release on October 25, 1955.

A good history of the earlier Air Force investigations of the "saucers" (which include Project SIGN in 1947-48 and Project GRUDGE in 1949-50) is given in the book "The Report on Unidentified Flying Objects" by Edward J. Ruppelt (Doubleday and Co., Inc., New York, 1956).

It will probably be evident to careful readers of the Report No. 14, even in its full original edition, that the Air Force "analysis" will not bear careful scrutiny. Throughout its "investigations", the Air Force has withheld information from the public. As a result, it is impossible for interested members of the general public to find out all that has been reported about flying saucers. The public has not had access to all the photographs and other evidence which the Air Force has amassed on the subject. Under these conditions, the public has not been able to draw the correct conclusions about the nature of the "saucers".

At the end of this analysis, before the body of the Blue Book Report, will be found several paragraphs headed "Suggestion to the Reader". Thoughtful persons who wish to learn the facts about flying saucers may find these suggestions of interest.

The analysis below will be in question-and-answer form.

[1] What percentage of the saucer sighting cases remain "Unknown"?

The press release on the facing page, and the Summary from the report, were the only material made readily available to the public by Project Blue Book. The full text of the report was essentially unavailable to the public, as shown in the Record of Hearings of the House Subcommittee on Government Information (Rep. John E. Moss, Chairman) for Nov. 15, 1956. One might wonder whether the Air Force had actually wanted to keep the full report from the public, and if so, why?

The answer may be found by reading the text and tables of the report, and comparing this with the Summary, distributed publicly with the press release. The key to the answer is contained in Fig. 8 (orig. p. 24) and Tables A1, A2, and A3 (orig. pp. 107 and 108). Fig. 8 shows that Unknown sightings constitute 33.3% of all the object sightings for which the reliability of the sighting is considered "Excellent". Tables A1--A3 agree with this; even if sightings of lesser reliability are included, the percentage of Unknown sightings is not less than about 20%. Note that the information in the main body of the report covers the years 1947--1952.

(analysis continues on page D-7)

NEWS RELEASE
PLEASE NOTE DATE

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

D-5

NO. 1053-55

IMMEDIATE RELEASE OCTOBER 25, 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 overflown 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 airmen. Other than reducing runway requirements we do not expect vertical-rising aircraft to have more outstanding military characteristics than conventional types.

MORE

D-6

"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

Since the Summary gives figures of 9% for the Unknown cases in 1953--1954, and only 3% for the Unknown cases in 1955 (up to May 5), it is evident that persons not having the full report available would not know that 20% to 30% of the cases had been left as Unknown in the main study. The Summary absolutely fails to quote any numerical results for 1947--1952. One may surmise that the Air Force did not want the public to know that such a high percentage of the reports remained Unknown, and that this was one reason for making the full report unavailable, for all practical purposes, to the public.

[2] What is the meaning and purpose of the Chi Square test (pages 60--76 of the original edition)?

The paragraph at the bottom of page 60 and top of page 61 (orig. ed.) explains the purpose of the "Chi Square" test, and the statistical theory involved is described on page 61. The reason for making this test was simply this: The author(s) of the report felt that it might be possible to show by this test that the Unknown cases were really just like the Known cases, after all. If this could be shown, it would then have been simple to say that the Unknowns had been essentially the same objects as the Knowns, and there would have been no residual "unknown" type of object ("flying saucer") to talk about.

As it turned out, the author(s) had to admit, at top of p. 68 (orig.) that there was very little probability that the Unknowns were the same as the Knowns. But they refused to admit that this meant that "saucers" could be a real type of novel object. Notice how they carry on the struggle to prove that the Unknowns are the same as the Knowns, until at the end of the "Chi Square Test" section, they admit that the results are inconclusive.

[3] What is the definition of "Flying Saucer" used in the Blue Book Report?

On p. 1 of the original text, third paragraph, a definition is given which is used by the author(s) of the report. It implies that some "secret military weapon" may be involved, by use of the words "Free World" and "intruder aircraft". There is no mention of "interplanetary vehicles" either from terrestrial or extra-terrestrial sources.

Also on page 1, in the second paragraph, is a facetious definition of "flying saucer" which, if adopted, would prevent any identification or explanation of flying saucers, by its very wording.

Unfortunately, the author(s) of the report, when referring to the definition of "flying saucer", (as for instance in their Conclusions, orig. p. 94, fourth paragraph), merely refer to "'flying saucers' (as defined on Page 1)". This leaves somewhat confused the question of which of the two definitions on page 1 they are referring to.

[4] How did the author(s) arrive at the conclusion, given at the end of the first full paragraph on orig. page 93, that "...it is still impossible to develop a picture of what a 'flying saucer' is."?

Persons trained in science and engineering, and those educated in the fields of law, accounting, business, medecine, or other disciplines in which logical thinking is a requisite, should be able to unravel the utter nonsense contained in the section of the report called " The 'Flying Saucer' Model", on orig. pages 76--94. It should be sufficient to call attention to several facts:

(a) The author(s) found only twelve cases reported in enough detail to merit consideration. Anyone who has followed the subject knows of many other cases of detailed sightings which would serve as well, or better, than the dozen selected for the Blue Book analysis.

(b) In discussing these twelve detailed cases, the report omits details such as the names of the localities and other identifying information which there is absolutely no reason to withhold. The reason for this may be to try to hinder readers who might want to compare other versions of those same cases with the versions presented by the report.

For instance, Case I on page 78(orig.) is apparently Cases 151 and 152 of the August, 1949,Project GRUDGE Report (Report No. 102-AC, 49/15-100, HQ, Air Materiel Command, Wright Field). The location is Indianapolis. Case II took place in Flint, Mich. Case III is from Sioux City, Iowa, and is reported as Case No. 7 in the Life Magazine article of April 7, 1952. Case V is the Chiles-Whitted case, from Montgomery, Alabama, which is written up in many books.

(c) The sketches of the objects in the Report have a certain studied awkwardness about them, as if the artist had been instructed to make the objects look as different as possible and as queer as possible. For example, the sketch of Case III resembles two frankfurters lying one across the other. The artist is certainly a skilled draftsman; the shading very clearly shows the cylindrical shapes of the frankfurters. Yet the description given by the pilots in Case III specifies "an airplane with a cigar-shaped body and straight wings". This sketch is absurd as an illustration of that. Likewise, the strange white markings or openings on the Case IX sketches have no relation to the accompanying text.

(d) The failure to place the sketches of Case VI and Case VIII on the same page hides a very remarkable resemblance.

(e) The key to the situation is found in the extra conditions thrown in at the middle of page 91 (orig.). Presumably all twelve cases had fulfilled such conditions or they would not have survived the weeding-out process. (See p. 77, orig.). The prize example is paragraph (6) on page 92. By throwing Case VI out at this point, the author(s) were then able to throw out Case VIII in par.(8), since the match between these two sketches had been lost by eliminating Case VI. Likewise, Case III was eliminated because Case II had been thrown out.

[5] Were the author(s) justified on page 93 (orig.) in saying the following?

"It may be that some reports represent observations of not one but several classes of objects that might have been "flying saucers"; however, the lack of evidence to confirm even one class would seem to make this possibility remote."

This appears to be another example of faulty logic. The author(s) had just thrown out cases because they did not resemble (supposedly) any other cases. This should be considered evidence that there may be more than one class of "flying saucers". In fact, at the top of page 91 (orig.) the author(s) list four categories of shapes, which might be considered to define four "classes" of saucers.

The logical error here may be seen in the paraphrase of the above quotation: " We found many different types of saucers. We could not find just one class. We could not find even one class. Therefore, we could not find more than one class." This type of reasoning, in which the author(s) of the Blue Book report indulged, is utterly absurd.

[6] What are the important points in the "Conclusions" on p. 94 (orig.)?

The author(s) admit in the first sentence that they cannot prove that "flying saucers" do not exist. In the last sentence, they do not deny that saucers could be novel governmental devices, now existing. Nowhere is there any discussion as to whether or not there is evidence to prove or disprove that saucers might be extraterrestrial objects or devices.

[7] What vitally important technical aspect was omitted from the analysis by the Blue Book Project?

At the bottom of page 6 (orig.), it is explained that, after the study was well under way, it was found that there was a "...need for the definition of a new factor relating to the maneuvers of the object or objects..." [Maneuvers would include the well-known characteristics of hovering, very sharp turns, rapid speed changes, wobbly flight, swinging like a pendulum, etc.] The last paragraph of page 6 (orig.) states "...at the time that the maneuver factor was determined to be critical, it was physically impracticable to...reevaluate the original data. Therefore, no code for maneuverability has been included..."

[8] What significant change was made in the categories provided for final identifications, before the final report was written and issued by the Air Force?

On page 12 (orig) the categories "Insufficient Information" and "Unknown" are explained. The whole report is written on the basis of these two categories and the others listed on page 10 (orig.). However, a most interesting change may be observed on page 295 (orig.) which is page 82 of this edition.

It will be seen, in the codes for Final Identification, that the category originally called "Rockets and Missiles", in the early work of the analysis, was changed to be called "Insufficient Information". Likewise, the final category of "Unknown" had originally been called "Electromagnetic Phenomenon". (The typewritten strikeovers and changes on page 295 (orig.) appear that way in the original Air Force Edition, and this edition is a true photo-copy of that page.)

It is interesting to speculate on the reason for changing the names of these categories. Note that the objects finally "identified" as in the "Unknown" category include almost all of the cases which would seem to be actual "flying saucers" as the public understands the term. Therefore, the fact that the Air Force originally called this category "electromagnetic phenomenon" may indicate that the Blue Book investigative staff had reason to believe that objects like the typical "flying saucer" might be electromagnetically propelled. This is of more than casual interest because of the persistent stories that circulate, which indicate that "saucers" make use of some system of electromagnetic propulsion.

Suggestion to the Reader

After reading the Blue Book Report which starts on the next page, if you feel a desire to see the complete set of tables and graphs (omitted here for reasons of cost), you might try to borrow a copy of the full report from the Air Force. Write to the Secretary of the Air Force, Pentagon Building, Washington 25, D.C., and ask for one of the loan copies of Blue Book Special Report No. 14.

If, after reading the report as given here, you feel that the Air Force should be able to give a definite answer to such specific questions as "Do flying objects of (such and such) shape exist?", you might write to your Congressman or Senator, or to the President of the United States, and ask his assistance in obtaining the answer to your specific question from the Air Force.

On page 37 of the official transcript of the press conference of Maj. Gen. John A. Samford at the Pentagon, July 29, 1952, a question was asked of the General: "Is it some very highly secret new weapon that we're working on that's causing these flying saucer reports?" The General answered: "We have nothing that has no mass and unlimited power!" The transcript indicates [Laughter] at that point, and well it might. If you believe that a more meaningful and definite answer is in order from the Air Force, you might write to any of the officials mentioned above for a specific answer to the specific question quoted in this paragraph.

The publisher of this edition would be very happy to learn of any responses which might be obtained by readers following any of these suggestions. Also, any comments from readers would be welcome.

NEW YORK OFFICE OF INFORMATION SERVICES
Public Information Division
Office, Secretary of the Air Force
Room 470E, 110 E. 45th Street
New York 17, New York

PROJECT BLUE BOOK

SPECIAL REPORT NO. 14

(ANALYSIS OF REPORTS OF UNIDENTIFIED AERIAL OBJECTS)

PROJECT NO. 10073

5 MAY 1955

AIR TECHNICAL INTELLIGENCE CENTER
WRIGHT-PATTERSON AIR FORCE BASE
OHIO

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SUMMARY

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 U.S., 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 the 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.

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

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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%
Aircraft	- 20%
Astronomical	- 25%
Other	- 13%
Insufficient Info	- 17%
Unknown	- 9%

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 AF Reg. 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 AISS, 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 7% and the unknown cases to 3%, 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%
Aircraft	- 21%
Astronomical	- 23%
Other	- 20%
Insufficient Info	- 7%
Unknown	- 3%

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.

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EXHIBIT B8

EXAMPLE OF AN IBM CARD

Air Force Cambridge Research Laboratories
L. G. Hanscom Field
Bedford, Massachusetts
Attn: CRXLR-2
14 Jun 1960

Air Force Cambridge Research Laboratories
Attn: CRXLR-2
L. G. Hanscom Field
Bedford, Massachusetts
14 Jun 1960

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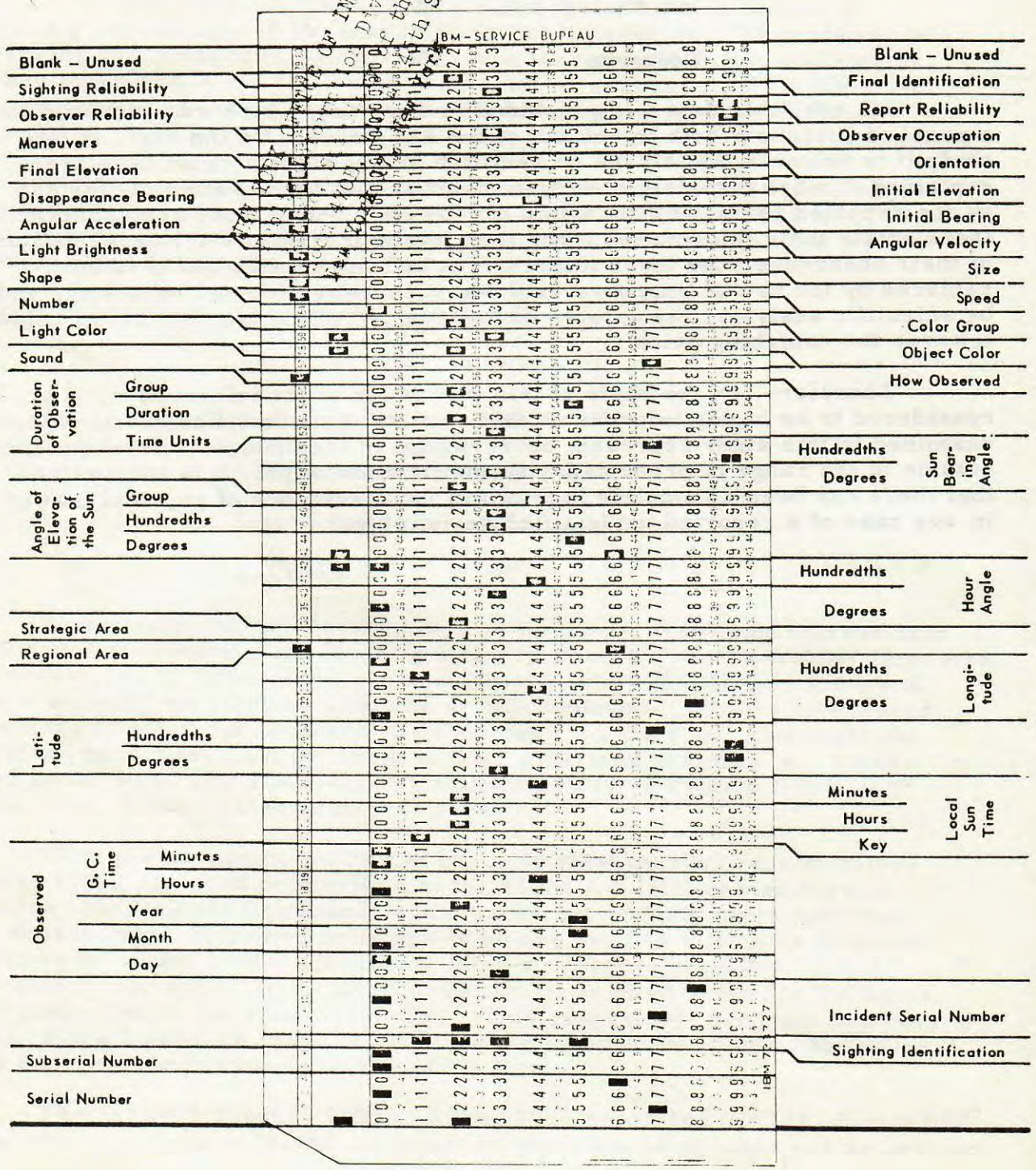
Division of the Air Force
4th Street



INTRODUCTION

NEW YORK OFFICE OF INFORMATION SERVICE

In June, 1947, Kenneth Arnold, a Boise, Idaho, businessman and private pilot, publicly reported the now-famous sighting of a chainlike formation of disc-shaped objects near Mount Rainier, Washington. Resulting newspaper publicity of this incident caught the public interest, and, shortly thereafter, a rash of reports of unidentified aerial objects spawned the term "flying saucers". During the years since 1947, many reports of unidentified aerial objects have been received by the Air Force from many and diverse sources.

The unfortunate term "flying saucer", or "flying disc", because of its widespread and indiscriminate use, requires definition. Many definitions have been offered, one of the best being that originated by Dr. J. Allen Hynek, Director of the Emerson McMillin Observatory of The Ohio State University, who has taken a scientific interest in the problem of unidentified aerial objects since 1949. Dr. Hynek's definition of the term is "any aerial phenomenon or sighting that remains unexplained to the viewer at least long enough for him to write a report about it"(1). Dr. Hynek, elaborating on his definition, says, "Each flying saucer, so defined, has associated with it a probable lifetime. It wanders in the field of public inspection like an electron in a field of ions, until 'captured' by an explanation which puts an end to its existence as a 'flying saucer'"(1).

This definition would be applicable to any and all of the sightings which remained unidentified throughout this study. However, the term "flying saucers" shall be used hereafter in this report to mean a novel, airborne phenomenon, a manifestation that is not a part of or readily explainable by the fund of scientific knowledge known to be possessed by the Free World. This would include such items as natural phenomena that are not yet completely understood, psychological phenomena, or intruder aircraft of a type that may be possessed by some source in large enough numbers so that more than one independent mission may have been flown and reported. Thus, these phenomena are of the type which should have been observed and reported more than once.

Since 1947, public interest in the subject of unidentified aerial objects fluctuated more or less within reasonable limits until the summer of 1952, when the frequency of reports of sightings reached a peak, possibly stimulated by several articles on the subject in leading popular magazines.

Early in 1952, the Air Force's cumulative study and analysis of reported sightings indicated that the majority of reports could be accounted for as misinterpretations of known objects (such as meteors, balloons, or aircraft), a few as the result of mild hysteria, and a very few as the result of unfamiliar meteorological phenomena and light aberrations. However,

(1) Hynek, J. A., "Unusual Aerial Phenomena", Journal of the Optical Society of America, 43 (4), pp 311-314, April, 1953.

a significant number of fairly complete reports by reliable observers remained unexplained. Although no evidence existed that unexplained reports of sightings constituted a physical threat to the security of the U. S., in March, 1952, the Air Force decided 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.

Originally, the problem involved the preparation and analysis of about 1,300 reports accumulated by the Air Force between 1947 and the end of March, 1952. During the course of the work, the number of reports submitted for analysis and evaluation more than tripled, the result of the unprecedented increase in observations during 1952. Accordingly, this study is based on a number of reports considered to be large enough for a preliminary statistical analysis, approximately 4,000 reports.

This study was undertaken primarily to categorize the available reports of sightings and to determine the probability that any of the reports of unidentified aerial objects represented observations of "flying saucers". With full cognizance of the quality of the data available for study, yet with an awareness of the proportions this subject has assumed at times in the public mind, this work was undertaken with all the seriousness accorded to a straightforward scientific investigation. In order to establish the probability that any of the reports of unidentified aerial objects represented observations of "flying saucers", it was necessary to make an attempt to answer the question "What is a 'flying saucer'?". However, it must be emphasized that this was only incidental to the primary purpose of the study, the determination of the probability that any of the reports of unidentified aerial objects represented observations of "flying saucers", as defined on Page 1.

The basic technique for this study consisted of reducing the available data to a form suitable for mechanical manipulation, a prerequisite for the application of preliminary statistical methods. One of International Business Machine Corporation's systems was chosen as the best available mechanical equipment.

The reduction of data contained in sighting reports into a form suitable for transfer to IBM punched cards was extremely difficult and time consuming.

For this study a panel of consultants was formed, consisting of both experts within and outside ATIC. During the course of the work, guidance and advice were received from the panel. The professional experience available from the panel covered major scientific fields and numerous specialized fields.

All records and working papers of this study have been carefully preserved in an orderly fashion suitable for ready reference. These

records include condensations of all individual sighting reports, and the IBM cards used in various phases of the study.

ORIGIN AND NATURE OF DATA

Reports of sightings were received by the U. S. Air Force from a representative cross section of the population of the U. S., and varied widely in completeness and quality. Included were reports from reputable scientists, housewives, farmers, students, and technically trained members of the Armed Forces. Reports varied in length from a few sentences stating that a "flying saucer" had been sighted, to those containing thousands of words, including description, speculation, and advice on how to handle the "problem of the 'flying saucers'". Some reports were of high quality, conservative, and as complete as the observer could make them; a few originated from people confined to mental institutions. A critical examination of the reports revealed, however, that a high percentage of them was submitted by serious people, mystified by what they had seen and motivated by patriotic responsibility.

Three principal sources of reports were noted in the preliminary review of the data. The bulk of the data arrived at ATIC through regular military channels, from June, 1947, until the middle of 1952.

A second type of data consisted of letters reporting sightings sent by civilian observers directly to ATIC. Most of these direct communications were dated subsequent to April 30, 1952, and are believed to be the result of a suggestion by a popular magazine that future reports be directed to the Air Technical Intelligence Center. As could be expected, a large number of letters was received following this publicity.

A third type of data was that contained in questionnaire forms completed by the observer himself. A questionnaire form, developed during the course of this study, was mailed by ATIC to a selected group of writers of direct letters with the request that the form be completed and returned. Approximately 1,000 responses were received by ATIC.

In general, the data were subjective, consisting of qualified estimates of physical characteristics rather than of precise measurements. Furthermore, most of the reports were not reduced to written form immediately. The time between sighting and report varied from one day to several years. Both of these factors introduced an element of doubt concerning the validity of the original data, and increased its subjectivity. This was intensified by the recognized inability of the average individual to estimate speeds, distances, and sizes of objects in the air with any degree of accuracy. In spite of these limitations, methods of statistical analysis of such reports in sufficiently large groups are valid. The danger lies in the possibility of

forgetting the subjectivity of the data at the time that conclusions are drawn from the analysis. It must be emphasized, again and again, that any conclusions contained in this report are based NOT on facts, but on what many observers thought and estimated the true facts to be.

Altogether, the data for this study consisted of approximately 4,000 reports of sightings of unidentified aerial objects. The majority were received through military channels or in the form of observer-completed questionnaires; a few were accepted in the form of direct letters from unquestionably reliable sources. Sightings made between June, 1947, and December, 1952, were considered for this study. Sightings alleged to have occurred prior to 1947 were not considered, since they were not reported to official sources until after public interest in "flying saucers" had been stimulated by the popular press.

REDUCTION OF DATA TO MECHANIZED COMPUTATION FORM

As received by the Air Technical Intelligence Center, the sighting reports were not in a form suitable for even a quasi-scientific study. A preliminary review of the data indicated the need for standardized interrogation procedures and supplemental forms for the reduction of currently held and subsequently acquired data to a form amenable to scientific appraisal.

The plan for reduction of the data to usable form consisted of a program of development comprising four major steps: (1) a systematic listing of the factors necessary to evaluate the observer and his report, and to identify the unknown object observed; (2) a standard scheme for the transfer of data to a mechanized computation system; (3) an orderly means of relating the original data to all subsequent forms; and (4) a consistent procedure for the identification of the phenomenon described by the original data.

Questionnaire

The first reports received by ATIC varied widely in completeness and quality. Air Force Letter 200-5[2] and Air Force Form 112[1] were attempts to fix responsibility for and improve the quality of the reports of sightings. To coordinate past efforts and to provide standardization for the

(1) A modified Air Force Form 112 lists pertinent questions to be answered in regard to an unidentified-object sighting.

(2) Air Force Letter 200-5 places responsibility with the Air Force for the investigation, reporting, and analysis of unidentified aerial objects. This letter is dated 29 April 1952.

future, it was imperative to develop a questionnaire form listing the factors necessary for evaluation of the observer and his report, and identification of the unknown objects. In addition, it was decided that such a questionnaire should be designed to serve as an interrogator's guide, and as a form for the observer himself to complete when personal interrogation was not possible or practicable.

Ideally, a questionnaire for the purposes required should contain questions pertaining to all technical details considered to be essential for the statistical approach, and should serve to obtain a maximum of information from the average individual who had made a sighting in the past or would be likely to be reporting sightings in the future. Besides these discrete facts, an integrated written description of a sighting would be required, thus enabling the reported facts of the sighting to be corroborated. Also, a narrative description might allow subtle questions to be answered concerning the observer's ability, such as indirect questions that would reveal his reasoning ability, suggestibility, and general mental attitude. As a whole, then, the information contained in a questionnaire should make possible the classification and evaluation of the sighting, the rating of the observer, the probability of accuracy of reported facts, and the identification of what was reported by the observer as unidentified.

During the course of this project, three questionnaire forms were developed, each intended to be an improved revision of the one preceding. The improvements were suggested and confirmed by members of the panel of consultants connected with this project.

The original form was evolved by the panel of consultants as their first work on this project. It was intended to allow the start of the reduction of reports to discrete data, and was immediately subjected to extensive review and revision by the panel. The revised (second) form was subjected to a trial test before adoption. ATIC sent a copy to observers reporting sightings, with the request that the form be completed and returned. Of the first 300 questionnaires returned during July and August, 1952, 168 were analyzed by a consulting psychologist. On the basis of this analysis, plus the experience gained in working with past reports, the final form of the questionnaire – the U. S. Air Force Technical Information Sheet – was evolved. Copies of the three forms of the questionnaire, in the order of their development, are shown as Exhibits B1, B2, and B3 in Appendix B.

In order to implement the transcription of data from past sighting reports, each succeeding form was put to use as soon as it was developed and approved. Accordingly, experience was obtained with each form in relation to past data, an important factor in the improvement of the quality and completeness of the later reports included in this study.

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Coding System and Work Sheet

The reduction of non-numerical data to numerical form is mandatory in the machine handling of data. Thus, the selection of the IBM punched-card system for analysis of data forced the adoption of a master coding plan. Since it was impracticable to transfer detailed data of an exact nature from the questionnaire to the IBM card, an intermediate transfer form, coordinated with the master code, was necessary.

The master coding plan was evolved during the early stages of the preliminary analysis of data, and was reviewed by the panel of consultants before use. It was recognized that this system of coding would be the heart of the analysis, that is, the completeness of the facility for translation of data could make or break the study. Accordingly, every conceivable factor that might influence the identification of unidentified aerial objects was included, together with a wide range of variations within each factor. The original coding system (with minor corrections) was used throughout the translation of the original data with marked success. A copy of this system, called CODES, is enclosed as Exhibit B4, Appendix B.

To facilitate the preparation of the punched-card abstract, an intermediate form called the WORK SHEET (later, the CARD BIBLE) was developed. Referenced to both the data from the questionnaire and the system of report identification, the WORK SHEET permitted an orderly transcription of data simultaneously by several people. In conjunction with the CODES, the WORK SHEET was used during the reduction of the original data to code form necessary for transfer to punched cards. A sample is included as Exhibit B5, Appendix B.

After the analysis was under way, it became apparent that the mechanics of machine processing could be improved by incorporating in the IBM card system group classifications of certain factors requiring more than one column for discrete expression. In addition, the inclusion of certain data relating to the evaluation and bearing of the sun with respect to the observer was considered necessary. Finally, a critical examination of certain segments of the data indicated the need for the definition of a new factor relating to the maneuvers of the object or objects sighted. Prior to the start of the analytical study, it had been assumed that a combination of stated factors would, by inference, define the maneuver pattern.

All these additions have been incorporated in a revised set of CODES and CARD BIBLE that are illustrated as Exhibits B6 and B7, Appendix B. However, at the time that the maneuver factor was determined to be critical, it was physically impracticable to make the required definitions and re-evaluate the original data. Therefore, no code for maneuverability has been included in the CODES, CARD BIBLE, or IBM cards.

Identification of Working Papers

The actual reduction of data to IBM punched-card form presented a problem of mass transfer of figures by several workers. Recognizing that an orderly system of relating the original data to the questionnaire, the WORK SHEET, and the IBM card was imperative, a scheme of SERIAL NUMBERS was developed to answer this need.

The first data consisted of a series of letter-file folders identified by the year and location of the sighting or sightings they contained. The number of reports of sightings in a single folder varied from 1 to over 20. Under these conditions, there was a great possibility for incorrect transcription of data, duplication of transcription, or misplacement of intermediate forms. Further, it was considered desirable to relate all sightings of the same object or objects to one another. The concept of a four-digit serial number (major), followed by a two-digit subserial number (minor), was adequate to fulfill these requirements.

To expedite handling of the data, temporary serial numbers were assigned until each report had been evaluated and the phenomenon had been placed in a category of identification. The use of temporary serial numbers permitted the consolidation of duplicate reports from apparently diverse sources, such as a teletype message and an Air Force Form 112. However, this consolidation was made ONLY when it could be proved conclusively that the sources of the two documents were one and the same. Factors of the observer's location, date and time of observation, description of the phenomenon, and finally, the name of the observer were considered. In this manner, the assignment of major serial and minor subserial numbers in continuous series was made only to the reports accepted for the statistical study. It is believed that the reports accepted represent unique and unduplicated instances of sightings.

In the establishment of the serial-number system, it was necessary to define certain terms, so that a standard interpretation could be achieved. The terms and corresponding definitions were:

OBSERVER – Any witness reporting to a proper authority that he had seen unidentified aerial objects.

SIGHTING – The report or group of reports of the same observed phenomenon that remained unidentified to the observer or observers, at least until reported.

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SINGLE OBSERVATION – A SIGHTING consisting of a single report from (1) one OBSERVER with no knowledge of additional OBSERVERS of the same phenomenon, or (2) a group of witnesses of the same phenomenon, each cognizant of the others. The witness who made the report is called a SINGLE OBSERVER.

MULTIPLE OBSERVATION – A SIGHTING consisting of several reports from OBSERVERS of the same phenomenon who were cognizant of each other. The witnesses who made reports are called MULTIPLE OBSERVERS.

ALL SIGHTINGS – (1) The group of reports consisting of one report for each OBSERVER, including both SINGLE and MULTIPLE OBSERVERS. (2) The questionnaire, work sheet, and IBM card representing the report from each OBSERVER – in other words, the representation of each report accepted for the statistical study.

UNIT SIGHTINGS – (1) The group of reports consisting of one report for each SIGHTING, including all the reports of SINGLE OBSERVATIONS and the one most representative report from each MULTIPLE OBSERVATION. (2) The questionnaire, work sheet, and IBM card representing the report for each SIGHTING accepted for the statistical study.

A major serial number (four digits) was assigned to each sighting, segregating the year of occurrence by selection of limits for each year, as follows:

0001 to 0500 reserved for 1947
0501 to 1000 reserved for 1948
1001 to 1500 reserved for 1949
1501 to 2000 reserved for 1950
2001 to 2500 reserved for 1951
2501 to 4900 reserved for 1952

While this scheme would serve to identify any individual sighting, identification of each report and its subsequent forms was necessary. The minor subserial numbers (two digits) fulfilled this requirement. For all SINGLE OBSERVATIONS, a major serial number followed by two (2) zeros, for example, 2759.00, was sufficient identification. For MULTIPLE OBSERVATIONS, the major serial number followed by a series of two-digit numbers ranging from 00 to 99 was used to identify the individual reports. In general, the most complete report from the most reliable observer of that

MULTIPLE OBSERVATION was identified with the .00 subserial number. As an example, a MULTIPLE OBSERVATION consisting of six sighting reports would have the following serial numbers:

1132.00 representing the best report and observer
1132.01 representing an additional observer
1132.02 representing an additional observer
1132.03 representing an additional observer
1132.04 representing an additional observer
1132.05 representing an additional observer

During the course of the transcription of the data to machine card form, it became obvious that certain reports could have been independent observations of the same phenomenon. So, if the presentation of an analysis based on one report for each sighting was valid (the concept of UNIT SIGHTINGS), a presentation of an analysis based on one report for each phenomenon should be valid also. Further, the examination of data relating to the actual number of phenomena was considered to be the proper basis for assessing the probability of technological developments outside the range of present-day scientific knowledge. Therefore, a designation of OBJECT SIGHTINGS was established, with the following definition:

OBJECT SIGHTING – (1) The group of reports consisting of one report for each phenomenon. (2) The questionnaire, work sheet, and IBM card representing a report for each phenomenon accepted for the statistical study.

In brief review, ALL SIGHTINGS refer to all reports, UNIT SIGHTINGS refer to actual sightings, and OBJECT SIGHTINGS refer to the assumed number of phenomena.

It must be recognized that the process of identifying OBJECT SIGHTINGS was deductive, while that for UNIT SIGHTINGS was definitive. A conservative approach was adopted in the determination of OBJECT SIGHTINGS, using the factors of date and time of observations, location of observers, duration of observations, and range, bearing, track direction, and identification of the phenomena. Any error of selection of OBJECT SIGHTINGS will tend to be in the direction of reducing the actual number of phenomena observed (several instances of UNIT SIGHTINGS that might be one OBJECT SIGHTING were noted, but the evidence was not conclusive enough to justify consolidation of the reports).

Following the determination of OBJECT SIGHTINGS, a series of serial numbers, called the INCIDENT SERIAL NUMBERS, was established to facilitate any future study of a specific object sighting. Each reported sighting that relates to an OBJECT SIGHTING received the same incident serial number, a four-digit code paralleling the major serial number series.

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For machine manipulation, it was desirable to be able to select the sample of cards (all reports, all sightings, or all phenomena) to be included in a particular study. The concept of a SIGHTING IDENTIFICATION NUMBER was evolved to fill this desire. Using one column of the IBM card, and the correlated working papers, the code for this function was developed. Multiple punching eliminated the need to use several columns for discrete expression of the variations. Selection of the proper number in this column thus permitted selection of the desired sample of cards.

Evaluation of Individual Reports

Evaluation of sighting reports was recognized as a crucial step in the preparation of data for statistical treatment; inconsistent evaluations would have invalidated any conclusions to be derived from this study. A method of evaluation was, therefore, determined simultaneously with the development of the questionnaire, the coding system, and the work sheet. It is emphasized that all phases of evaluation, even including the tedious preparation of the original data for statistical treatment, were entrusted only to selected, specially qualified scientists and engineers.

Evaluation consisted of a standardized procedure to be followed for: (1) the deduction of discrete facts from data which depended on human impressions rather than scientific measurements, (2) the rating of the observer and his report as determined from available information, and (3) the determination of the probable identification of the phenomenon observed. Categories of identification, established upon the basis of previous experience, were as follows:

Balloon
Astronomical
Aircraft
Light phenomenon
Birds
Clouds, dust, etc.
Insufficient information
Psychological manifestations
Unknown
Other

The first step in evaluation, the deduction of discrete facts from subjective data, required certain calculations based on the information available in the sighting report. An example was the finding of the approximate angular velocity and acceleration of the object or objects sighted. Care was taken during this phase of the work to insure against the deduction of discrete facts not warranted by the original data. Thus, even though there was a complete lack of any valid evidence consisting of

physical matter in any case of a reported unidentified aerial object, this was not assumed to be prima facie evidence that "flying saucers" did not exist.

In those cases in which an attempt to reduce the information to a factual level failed completely, the report was eliminated from further consideration, and thus not included in the statistical analysis. About 800 reports of sightings were eliminated or rejected in this manner. Most of these reports were rejected because they were extremely nebulous; the rest were rejected because they contained highly conflicting statements.

The second step in evaluation, the rating of the observer and his report, logically followed the first step, the reduction of the data to usable form. Ratings were assigned on the basis of the following factors of information, considered in relation to one another:

(1) The experience of the observer, deduced from his occupation, age, and training;

(2) The consistency among the separate portions of the description of the sighting;

(3) The general quality and completeness of the report;

(4) Consideration of the observer's fact-reporting ability and attitude, as disclosed by his manner of describing the sighting.

In cases in which insufficient information was available to make a judgment of the observer or report, none was made, but the report was accepted for the statistical study.

The third step in the process of evaluation, the attempted identification of the object or objects sighted, was done twice, first by the individual who made the transcription of the data (the preliminary identification), and later (the final identification) by a conference of four persons, two representatives from ATIC and two from the panel of consultants. Although representatives of ATIC participated in making the final identifications, it must be emphasized that any previous identification of a sighting made by ATIC was not introduced or referred to in any way.

In the coding system, the choices provided for final identifications were based on ATIC's previous experience in analysis of the data. They had found that the majority of sightings could be classified as misinterpretations of common objects or natural phenomena. Accordingly, categories for objects most frequently present in the air were provided. Balloons, aircraft, astronomical bodies (such as meteors), birds, and clouds or dust were recognized as major categories. The less frequent, but common objects, such as kites, fireworks, flares, rockets, contrails, and

meteorological phenomena like small tornadoes, were collected into a category called OTHER. A separate category for the uncommon natural phenomena associated with light reflections or refractions, such as mirages, sun dogs, inversion-layer images, and distortions caused by airborne ice, was established with the title of LIGHT PHENOMENON. Categories for INSUFFICIENT INFORMATION, PSYCHOLOGICAL MANIFESTATIONS, and UNKNOWN were provided for the sightings that could not be fitted into the preceding identifications. An explanation of their use follows:

INSUFFICIENT INFORMATION – This identification category was assigned to a report when, upon final consideration, there was some essential item of information missing, or there was enough doubt about what data were available to disallow identification as a common object or some natural phenomenon. It is emphasized that this category of identification was not used as a convenient way to dispose of what might be called "poor unknowns", but as a category for reports that, perhaps, could have been one of several known objects or natural phenomena. No reports identified as INSUFFICIENT INFORMATION contain authenticated facts or impressions concerning the sighting that would prevent its being identified as a known object or phenomenon;

PSYCHOLOGICAL MANIFESTATIONS – This identification category was assigned to a report when, although it was well established that the observer had seen something, it was also obvious that the description of the sighting had been overdrawn. Religious fanaticism, a desire for publicity, or an over-active imagination were the most common mental aberrations causing this type of report;

UNKNOWN – This designation in the identification code was assigned to those reports of sightings wherein the description of the object and its maneuvers could not be fitted to the pattern of any known object or phenomenon.

For the purposes of this study, two groups of identifications were recognized, the KNOWNS (including all identification categories except the UNKNOWNS) and the UNKNOWNS.

All possible identifications provided in the code system, except INSUFFICIENT INFORMATION and UNKNOWN, could be assigned according to two degrees of certainty, designated "Certain" and "Doubtful".

A "Certain" identification indicated a minimum amount of doubt regarding the validity of the evaluation. By "rule-of-thumb" reasoning, the probability of the identification being correct was better than 95 per cent. A "Doubtful" identification indicated that the choice was less positive, but that there was a better than even chance of being correct.

It is emphasized again that, as was true for other phases of evaluation, preliminary and final identification was entrusted only to scientists and engineers who, in addition to their broad scientific background, had received instruction, where necessary, in specialized subjects. The panel of consultants provided background information for this instruction. Many of the cases representing unusual features or maneuvers were submitted to and discussed with various members of the panel of consultants prior to the final identification.

Consistency in the application of the knowledge necessary for making identifications was maintained by frequent collaboration among the personnel involved, and systematic spot checks of the work. In addition to the general fund of knowledge required to identify satisfactorily a reported unidentified aerial object, an attempt was made to correlate specific data such as flight plans of aircraft, records of balloon releases, weather conditions, and an astronomical almanac with the reported sighting.

The procedure followed in making final identifications deserves explanation because of the importance assumed by the identification as a basis for statistical treatment. As was mentioned, a conference of four qualified persons, two from ATIC and two from the panel of consultants, decided upon the final identification for each sighting report. This work was done at ATIC, periodically, as reports became ready.

During an identification conference, each sighting report was first studied, from the original data, by one person. If that person arrived at a decision, it was checked against the preliminary identification; if the two identifications were the same, the report was appropriately marked and considered finished. If the two identifications did not agree, the report was considered later by everyone participating in the conference until a group decision could be made.

If an evaluator was unable to categorize the report as one of the common objects or as a natural phenomenon, and his opinion was that the sighting should be recorded as UNKNOWN, a group decision was also required on that report before it was considered finished. A group decision was necessary on all reports finally recorded as UNKNOWN, regardless of what the preliminary identification had been. In cases where a group decision was not made within a reasonable time, the report was put aside and later submitted to certain members of the panel of consultants for their opinions. If, after this, disagreement continued to exist, the report of the sighting was identified as UNKNOWN.

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Upon completion of final identifications, all data were transferred to IBM cards, preparatory to analysis.

ANALYSIS OF THE DATA

Broadly stated, the problem at this point consisted of the judicious application of scientific methods of categorizing and analyzing the subjective data in reports of sightings of unidentified aerial objects. It was recognized that an approach to this problem could best be made by a systematic sorting and tabulation program to give frequency and percentage distributions of the important characteristics of sightings. A suggestion that an attempt be made to anticipate all questions that might be asked in the future about a sighting or a group of sightings, and to provide answers, was rejected. The systematic approach also made it possible to develop a detailed reference manual of the attributes of the sightings included in this study.

Thus, at the beginning of the analysis, a detailed plan was developed for sorting, counting, and tabulating the information from the punched-card abstracts of reports of sightings. It was believed at the time, and later substantiated, that the results of the program for sorting and tabulating would serve as a guide for the more sophisticated treatment involving statistical methods.

Also, it was anticipated that any patterns or trends that might be found could be subjected to concentrated study in the hope of discovering significant information relating to the characteristics of "flying saucers". Further, it was believed that these trends could serve as certain of the criteria of validity for any concepts (models) developed in the attempt to discover a class of "flying saucers".

The three parts of this study (1) the sorting and tabulation program, (2) the advanced study of the results of that program, and (3) the investigation of the possibility of conceiving a model of a "flying saucer" from descriptions reported, are discussed in sections entitled "Frequency and Percentage Distributions by Characteristics", "Advanced Study of the Data", and "The 'Flying Saucer' Model".

Frequency and Percentage Distributions by Characteristics

The original conception of this study assumed the availability of sufficient data to describe adequately the physical appearance, maneuver characteristics, range, direction, and probable path of the object or objects observed. However, familiarity with the data, acquired during the

translation and transcription from reports to punched cards, indicated that there would be relatively few specific variables or factors that would yield meaningful correlation studies. Either the original data were too subjective, or the incompleteness of the original reports would seriously reduce the sample of a specific variable.

Preliminary tabulations of various sortings substantiated the impossibility of deriving statistical results from certain variables, such as movement of the observer during the sighting, sound, shape parameter, size, angular velocity and acceleration, appearance and disappearance bearing, initial and final elevation, altitude, and orientation of the object. The statistically usable variables presented in this study include the date, time, location, duration, reliability, and method of observation of the sighting, and the physical attributes of number, color, speed, shape, light brightness, and identification of the objects sighted.

The presentation of frequency and percentage distributions of any of the variables must be interpreted in the light of the sample of incidents represented. For example, the analysis of the reported colors of the objects sighted, based on ALL SIGHTINGS, could lead to misrepresentation of the distribution of the reported color of the objects, because of the multiplicity of reports on some of the phenomena. On the other hand, the percentage distribution of the light brightness reported by each observer is more likely to be correct than a distribution based on one report for each phenomenon. To assure that the most nearly correct presentation was made, and to avoid the possibility of failure to uncover any pattern or trend inherent in the data, the variables were studied on five different bases or samples. These samples, and their numerical relation to each other, were as follows:

ALL SIGHTINGS (all reports)	— 3,201 cards
UNIT SIGHTINGS, all observers	— 2,554 cards
UNIT SIGHTINGS, single observer	— 2,232 cards
UNIT SIGHTINGS, multiple observers	— 322 cards
OBJECT SIGHTINGS	— 2,199 cards

The preliminary tabulations indicated that the samples based on UNIT SIGHTINGS, single observer, and UNIT SIGHTINGS, multiple observers, would not add materially to this study. Accordingly, although the frequency distributions were recorded and are available for study, they are not presented in this report.

The bases of ALL SIGHTINGS, UNIT SIGHTINGS (referring to all observers), and OBJECT SIGHTINGS are presented in Appendix A as Tables A1 through A240. A critical study of these tabulations reveals that there is no apparent change in the distribution of any variable from one basis to another, and that no marked patterns or trends exist in any sample.

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Graphical Presentation

Graphical representation of the important information contained in the tables is presented in Figures 1 through 38. These figures present the distributions of the important variables only by the total number of cases in each identification category, since no significant differences were found between the distributions of "Certain" and "Doubtful" identifications of objects with respect to the variables. A chronological study of these figures will afford a broad picture of the tabulated information, without the necessity of a detailed study of the tables.

A critical examination of the figures will show that no trends, patterns, or correlations are to be found, with the exception of Figures 18 through 30. The apparent similarity of the distributions shown by these mirror graphs, Figures 18 through 23, was tested by statistical methods which showed that there was a low probability that the distributions of the KNOWNS and UNKNOWNS by these characteristics were the same. These tests and their interpretation are discussed in the following section. For purposes of this study, the strategic areas, shown in Figures 32 through 38, and Tables A223 through A240, Appendix A, were designated on the basis of concentration of reports of OBJECT SIGHTINGS in an area. No other interpretation of the tables or remaining charts was deemed necessary.

Advanced Study of the Data

It was recognized that the lack of any patterns or trends, as shown by the tabulations and graphs, provided an insecure basis for drawing definite conclusions. Accordingly, shortly before the sorting and tabulation program was concluded, a program of study of the data was developed to utilize statistical and other mathematical methods, which could lead to a more concrete interpretation of the problem.

Position of the Sun Relative to the Observer

The first thing that was done was to calculate 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 each sighting. With this information, it could then be determined whether there was a possibility that the reported object could have been illuminated by light from the sun. In addition, it could be determined whether an object could be a mock sun (sun dog) or whether there was a possibility of specular reflection from an aircraft at the position of the object, which would give the appearance of a "flying disc".

A program of computation was set up and carried out to obtain the angle of elevation and the bearing of the sun for each sighting. All information needed for this calculation was available on the deck of IBM cards.

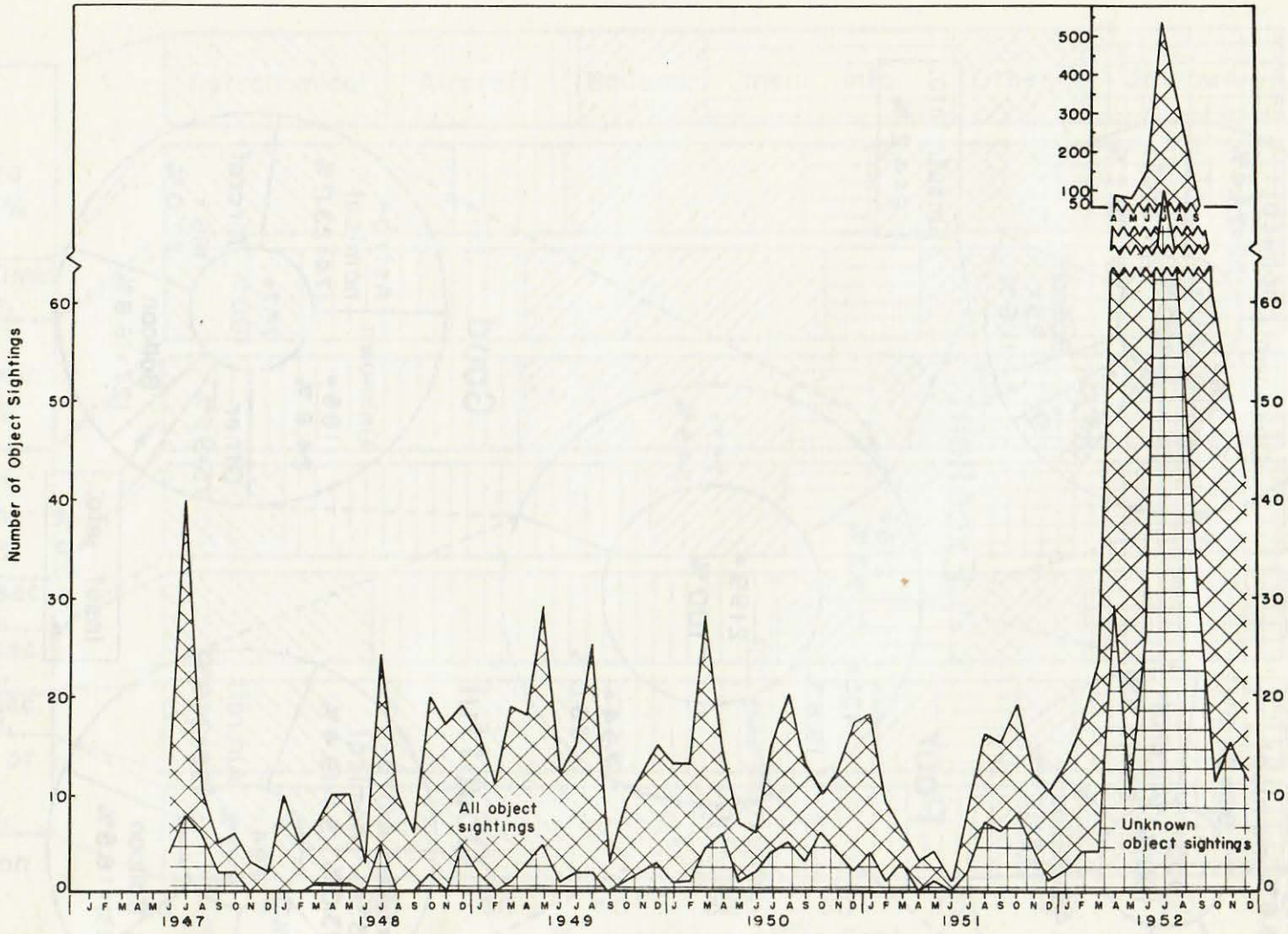

FIGURE 7 FREQUENCY OF OBJECT SIGHTINGS AND UNKNOWN OBJECT EVALUATIONS BY MONTHS, 1947-1952

C-7485

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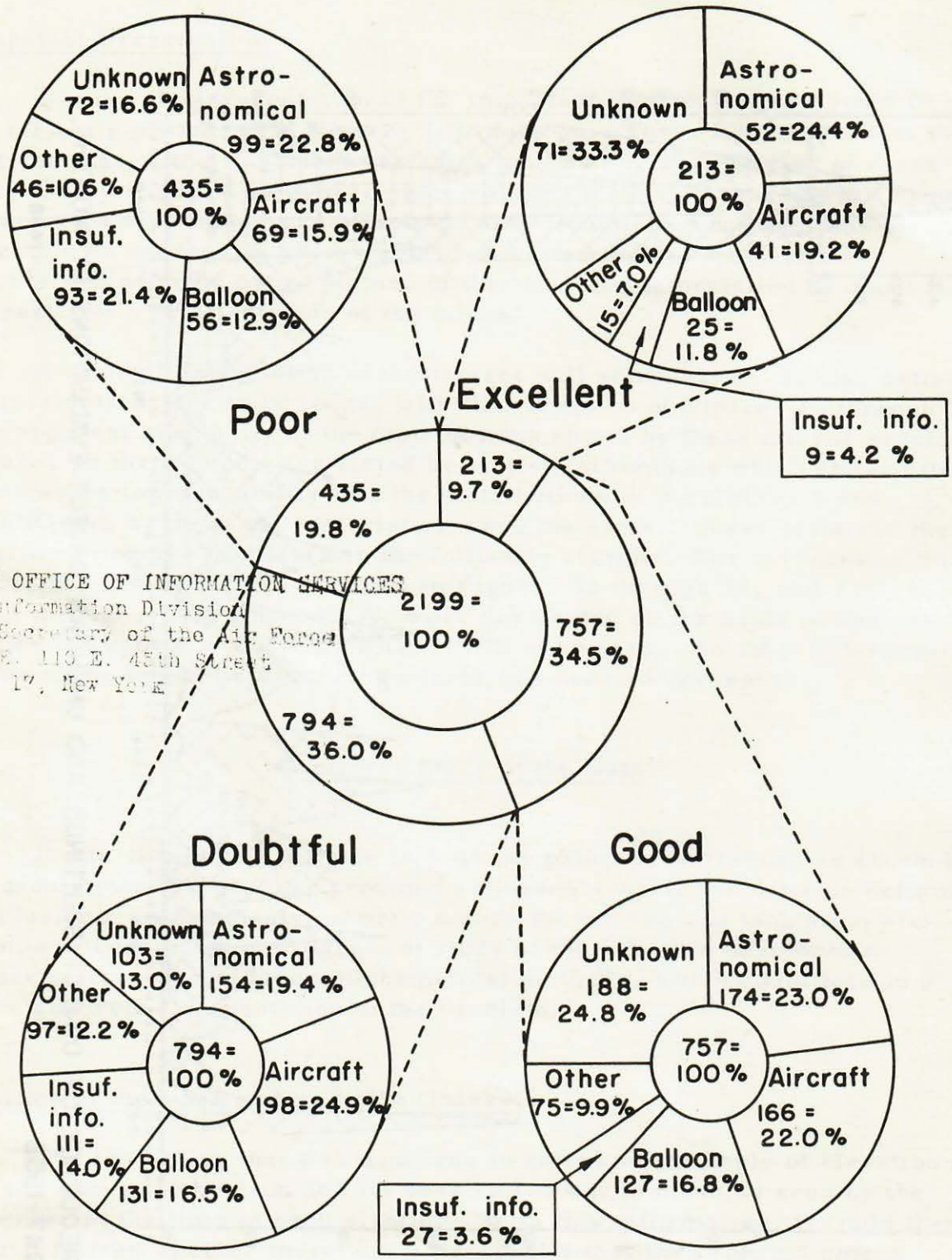

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FIGURE 8 DISTRIBUTION OF OBJECT SIGHTINGS BY SIGHTING RELIABILITY GROUPS WITH EVALUATION DISTRIBUTIONS FOR EACH GROUP

A-7486

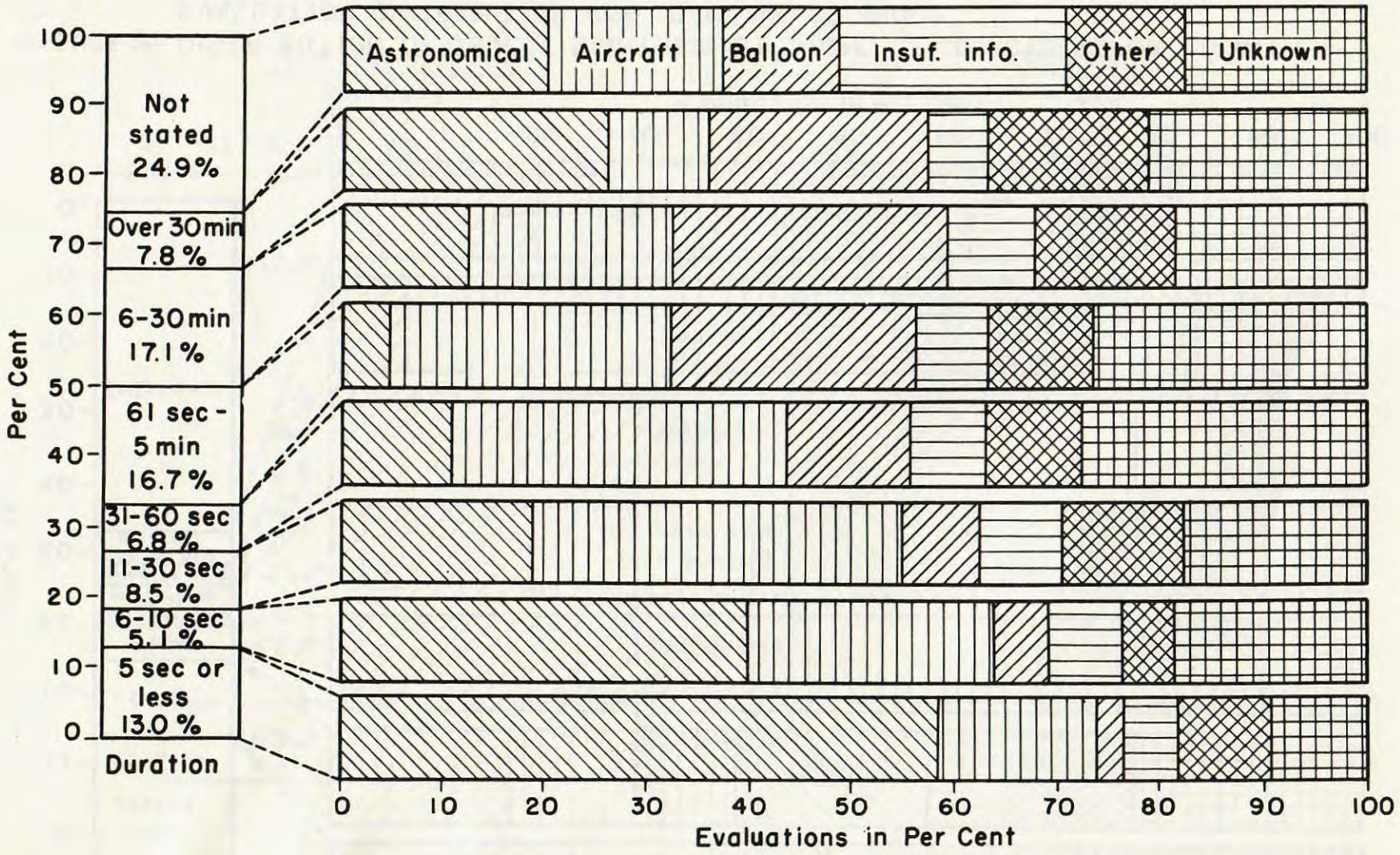

FIGURE 13 DISTRIBUTION OF OBJECT SIGHTINGS BY DURATION OF SIGHTING WITH EVALUATION DISTRIBUTION FOR EACH DURATION GROUP

A-7491

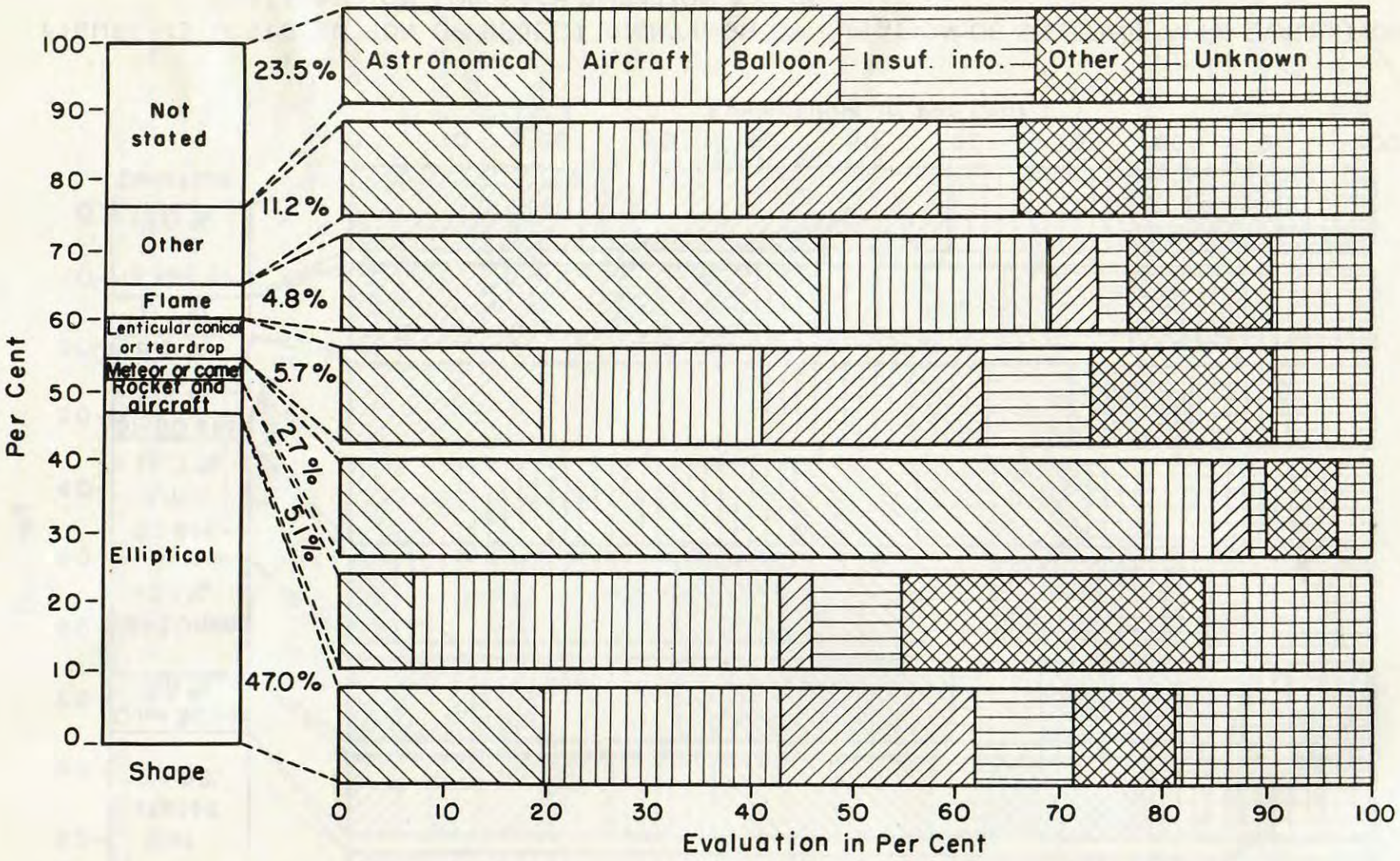

FIGURE 15 DISTRIBUTION OF OBJECT SIGHTINGS BY SHAPE OF OBJECT(S) REPORTED WITH EVALUATION DISTRIBUTION FOR EACH SHAPE GROUP

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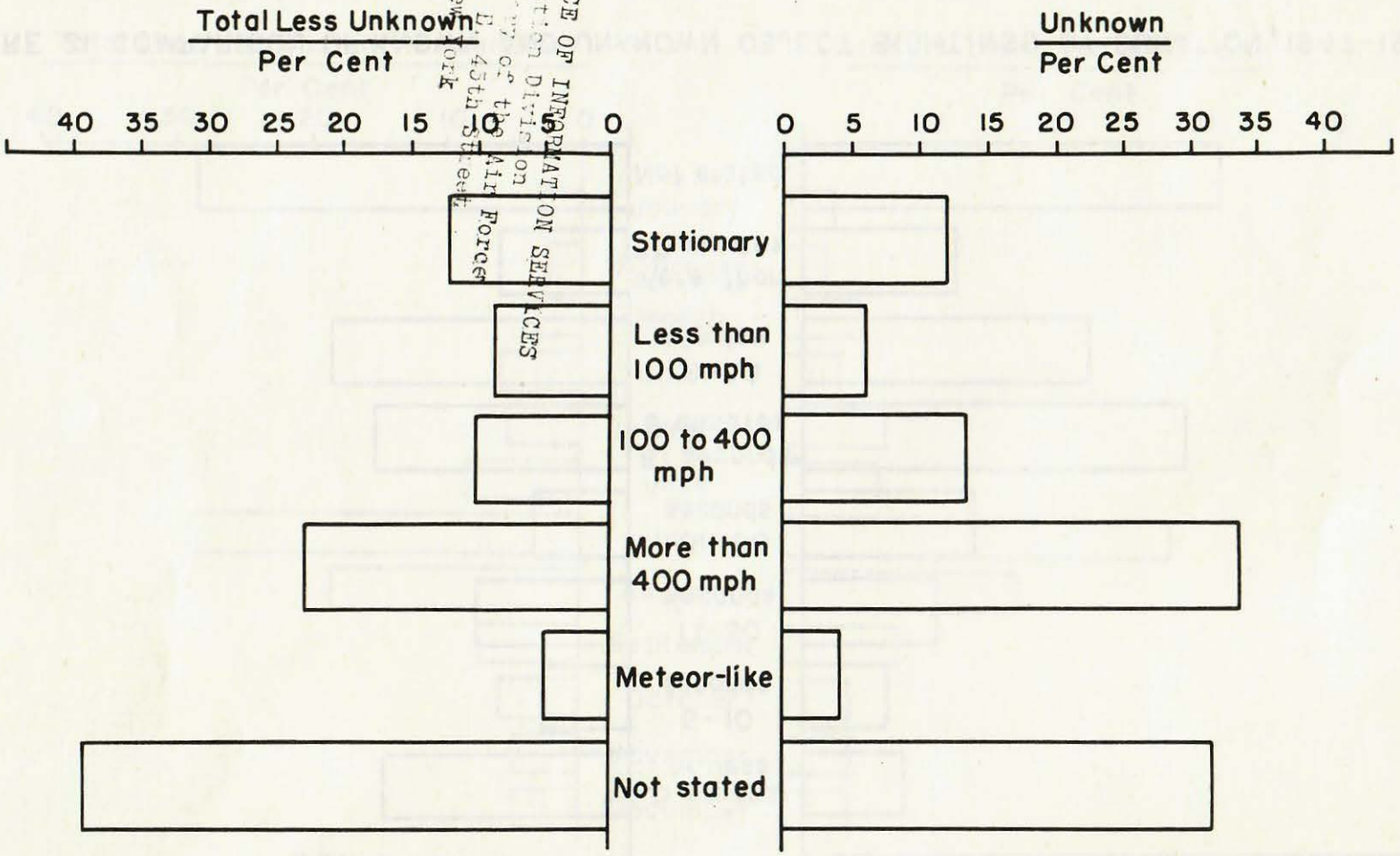

FIGURE 20 COMPARISON OF KNOWN AND UNKNOWN OBJECT SIGHTINGS BY SPEED, 1947-1952

A-7498

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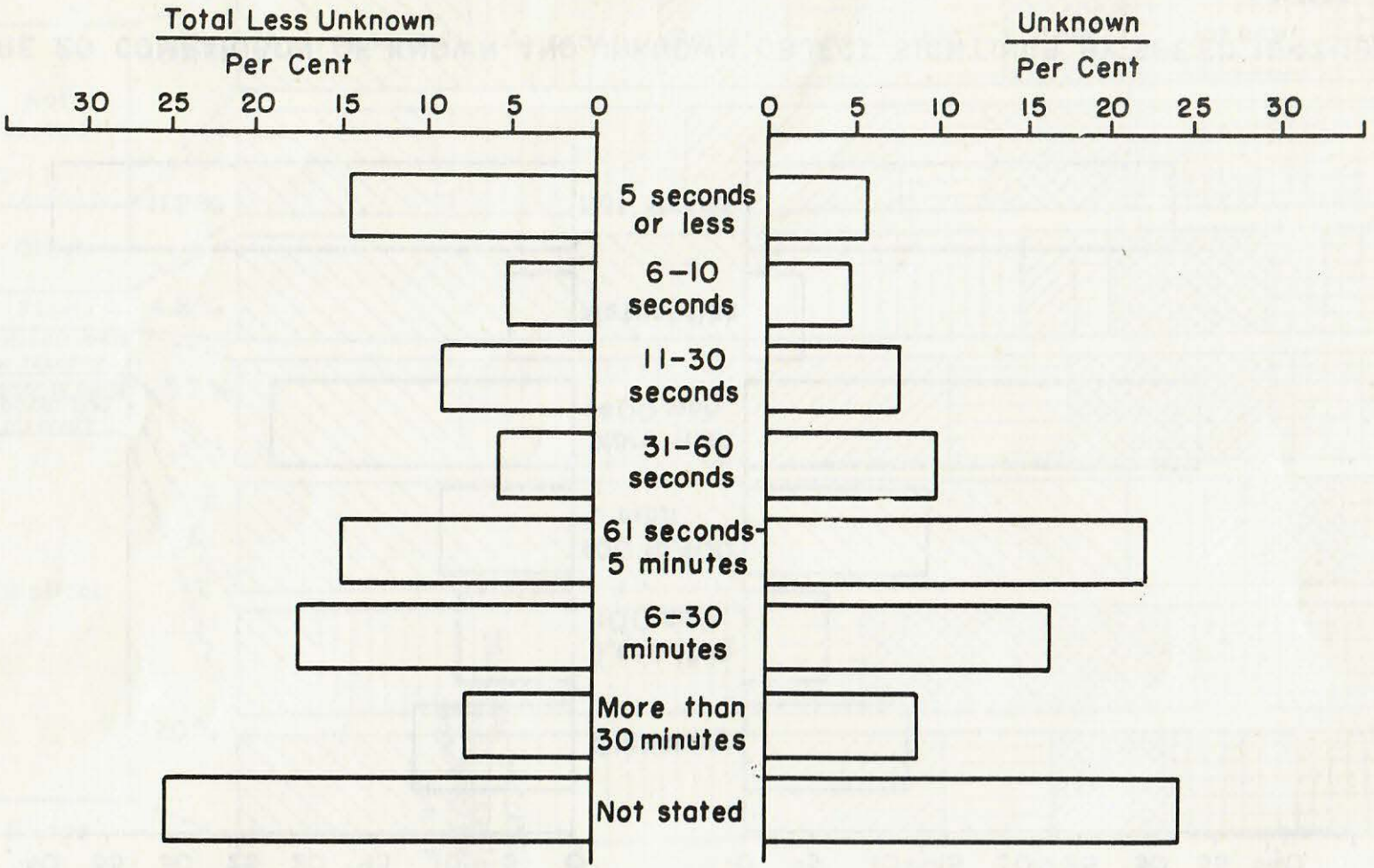

FIGURE 21 COMPARISON OF KNOWN AND UNKNOWN OBJECT SIGHTINGS BY DURATION, 1947-1952

A-7499

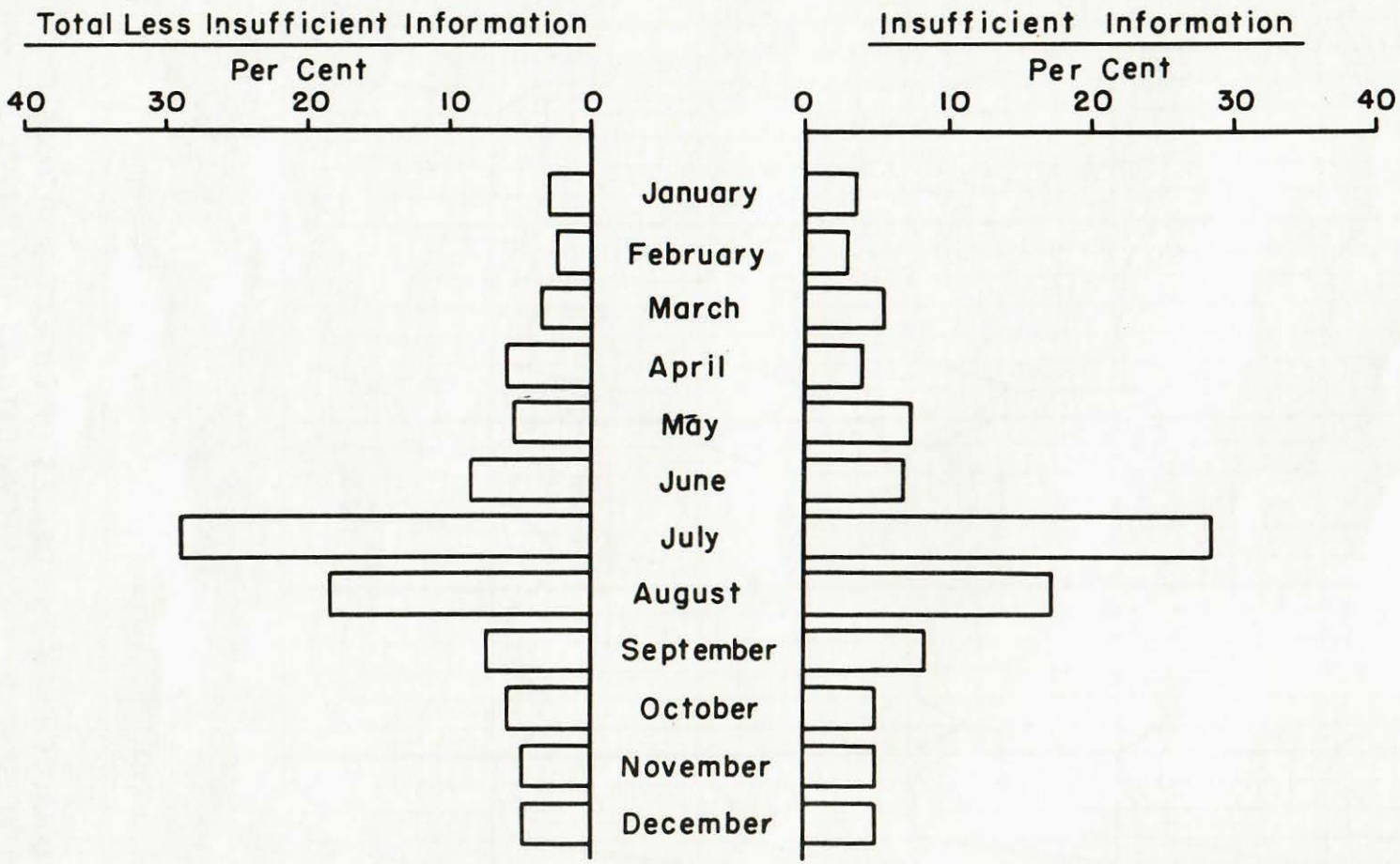

FIGURE 27 COMPARISON OF MONTHLY DISTRIBUTION OF OBJECT SIGHTINGS EVALUATED AS INSUFFICIENT INFORMATION VERSUS TOTAL OBJECT SIGHTINGS LESS INSUFFICIENT INFORMATION

A-7505

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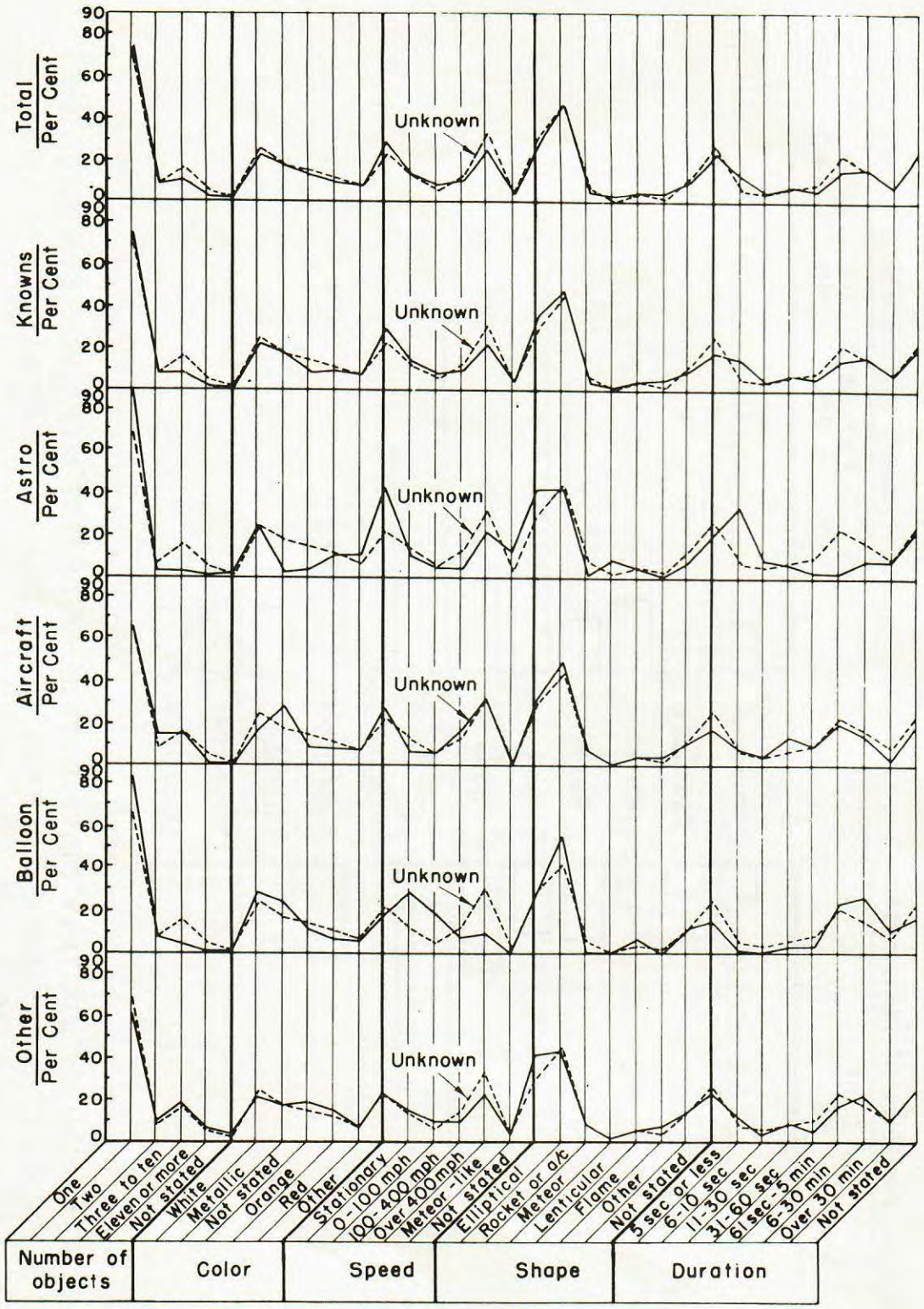

FIGURE 30 CHARACTERISTICS PROFILES OF OBJECT SIGHTINGS BY TOTAL SAMPLE, KNOWN EVALUATIONS, AND INDIVIDUAL KNOWN EVALUATIONS, WITH UNKNOWN EVALUATIONS SUPERIMPOSED

B-7508

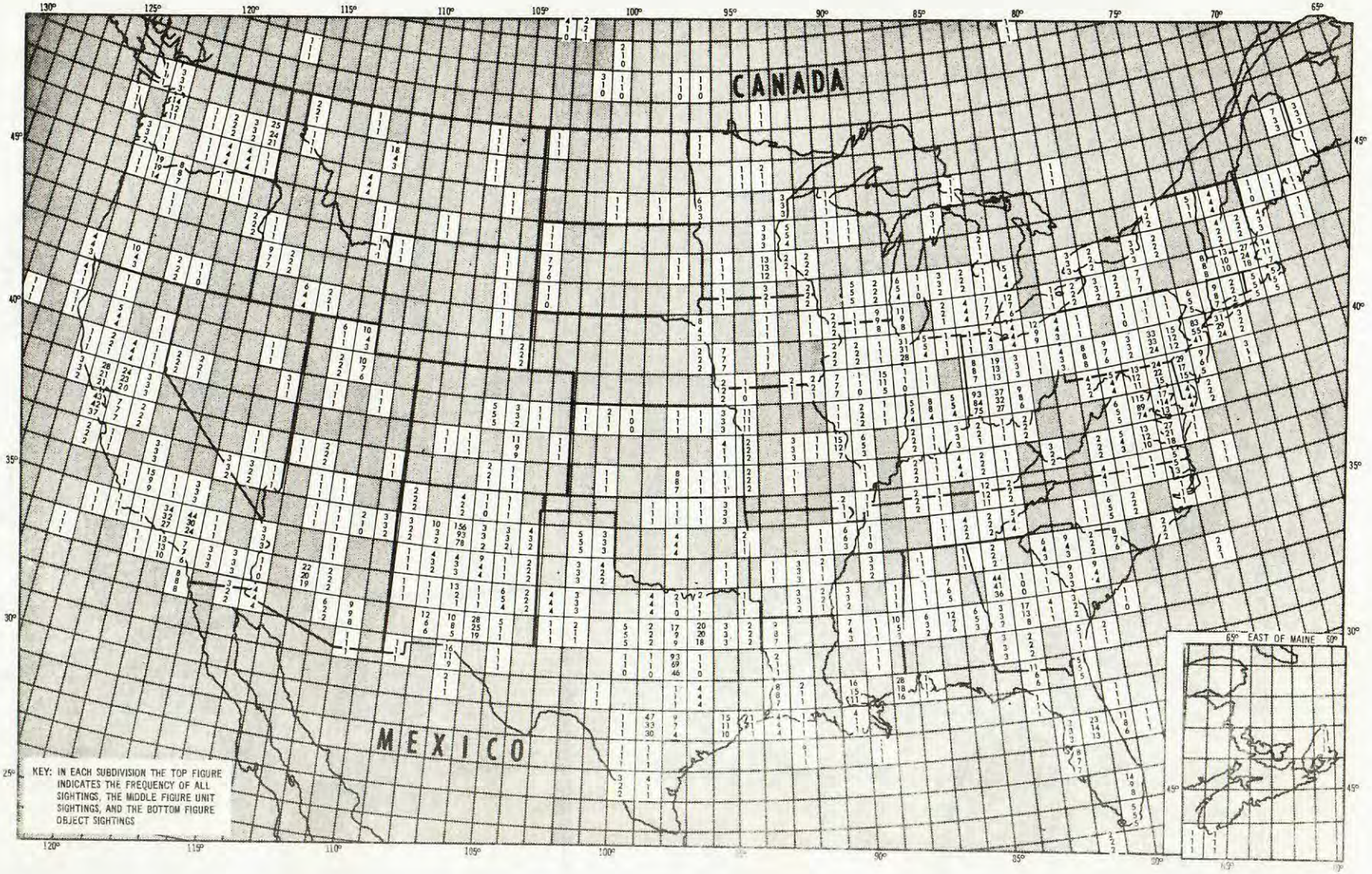

FIGURE 31 FREQUENCY OF OBJECT, UNIT, AND ALL SIGHTINGS WITHIN THE UNITED STATES 1947–1952, BY SUBDIVISIONS OF ONE DEGREE OF LATITUDE AND LONGITUDE

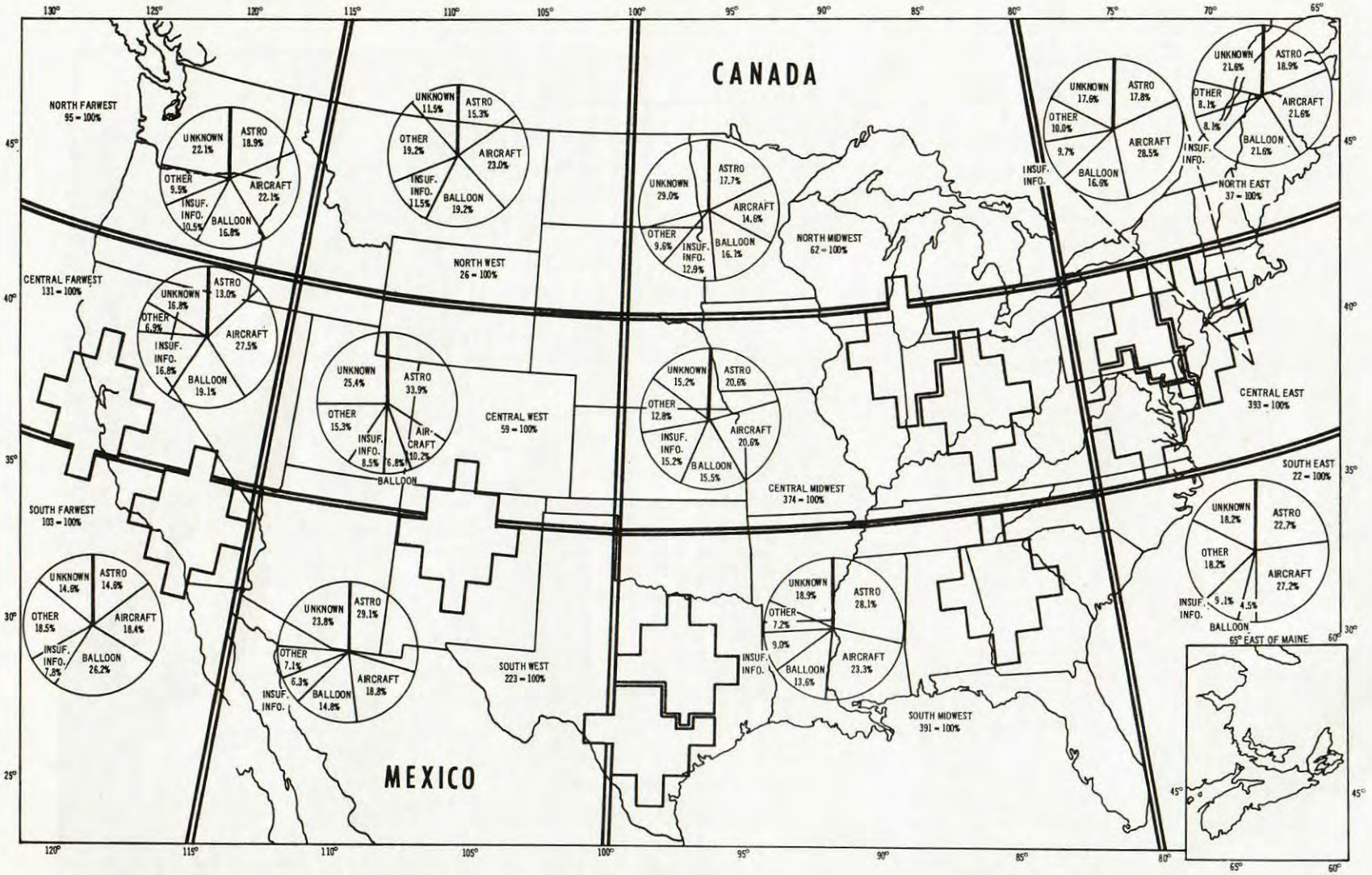

FIGURE 32 DISTRIBUTION OF OBJECT SIGHTINGS BY EVALUATION FOR THE TWELVE REGIONAL AREAS OF THE UNITED STATES, WITH THE STRATEGIC AREAS LOCATED (STRATEGIC AREAS WERE DETERMINED ON THE BASIS OF CONCENTRATION OF OBJECT SIGHTINGS)

This information consisted of:

(1) Time and date of observation in Greenwich Civil Time

(2) Latitude and longitude of the observer at the time of observation.

Figure 39 shows a celestial sphere on which Z represents the observer's zenith, s represents the sun, and N represents the north celestial pole.

Using the date and time of the observation, the longitude and declination (S) of the sun were obtained from an ephemeris of the sun and corrected for the equation of time. The difference between the longitudes of the sun and the observer was taken, and called the hour angle (HA on Figure 39).

Then, using the declination of the sun (S), the latitude of the observer (lat), and the hour angle (HA), the angle (ZS) between the observer's zenith and the sun can be calculated from the law of cosines of spherical trigonometry. Thus, $\cos \overline{ZS} = \cos (90 - \text{lat}) \cos (90 - S) + \sin (90 - \text{lat}) \sin (90 - S) \cos (HA)$.

Since the angle ZS is measured from the observer's zenith, the angle of elevation of the sun above the horizon for daytime sightings was found by taking $90 - \overline{ZS}$. When the sun was below the horizon, the angle of depression of the sun below the horizon was found by taking $\overline{ZS} - 90$.

Having found the angle ZS, the bearing of the sun (angle B) was obtained from the formula:

$$\frac{\sin (B)}{\sin (90 - S)} = \frac{\sin (HA)}{\sin (ZS)}$$

All of the above calculations were made with IBM equipment. Sines, cosines, and their inverses were obtained from a deck of 9,000 IBM cards on which seven-place Peter's tables of the sines, cosines, and tangents of angles had been punched for each 0.01 of a degree from 0 to 90 degrees.

Upon completion of these calculations, the cards representing OBJECT SIGHTINGS were sorted on the sign of the sine of the bearing angle. This separated the cards into two groups: (1) sightings which occurred between noon and midnight, for which the sine of the bearing angle was positive; and (2) sightings between midnight and noon, for which the sine of the bearing angle was negative. Then each of these groups was sorted into groups for intervals of 10° in angle of elevation of the sun from -90° to +90°. A count was made of the number of cards in each group and from this a histogram was constructed (Figure 40). The UNKNOWN OBJECT SIGHTINGS were then sorted out, counted in the same manner, and a histogram was made (again see Figure 40).

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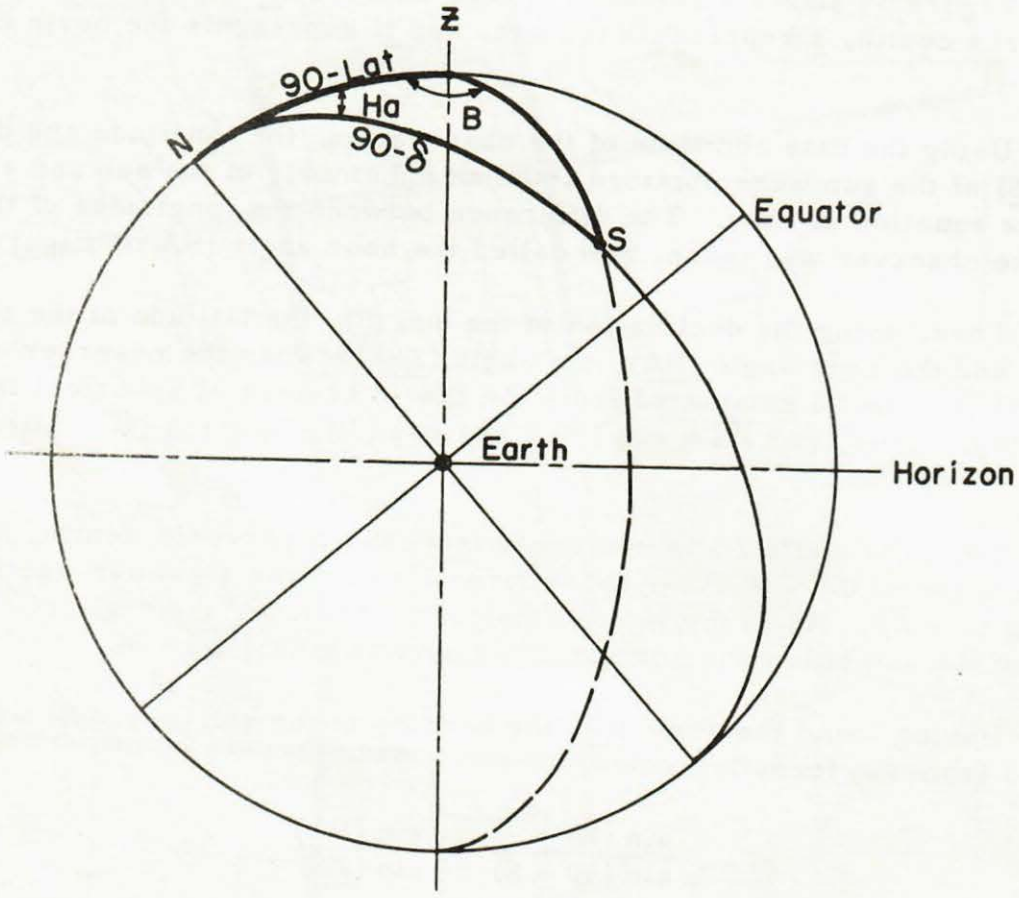

FIGURE 39 DIAGRAM OF A CELESTIAL SPHERE

A-7535

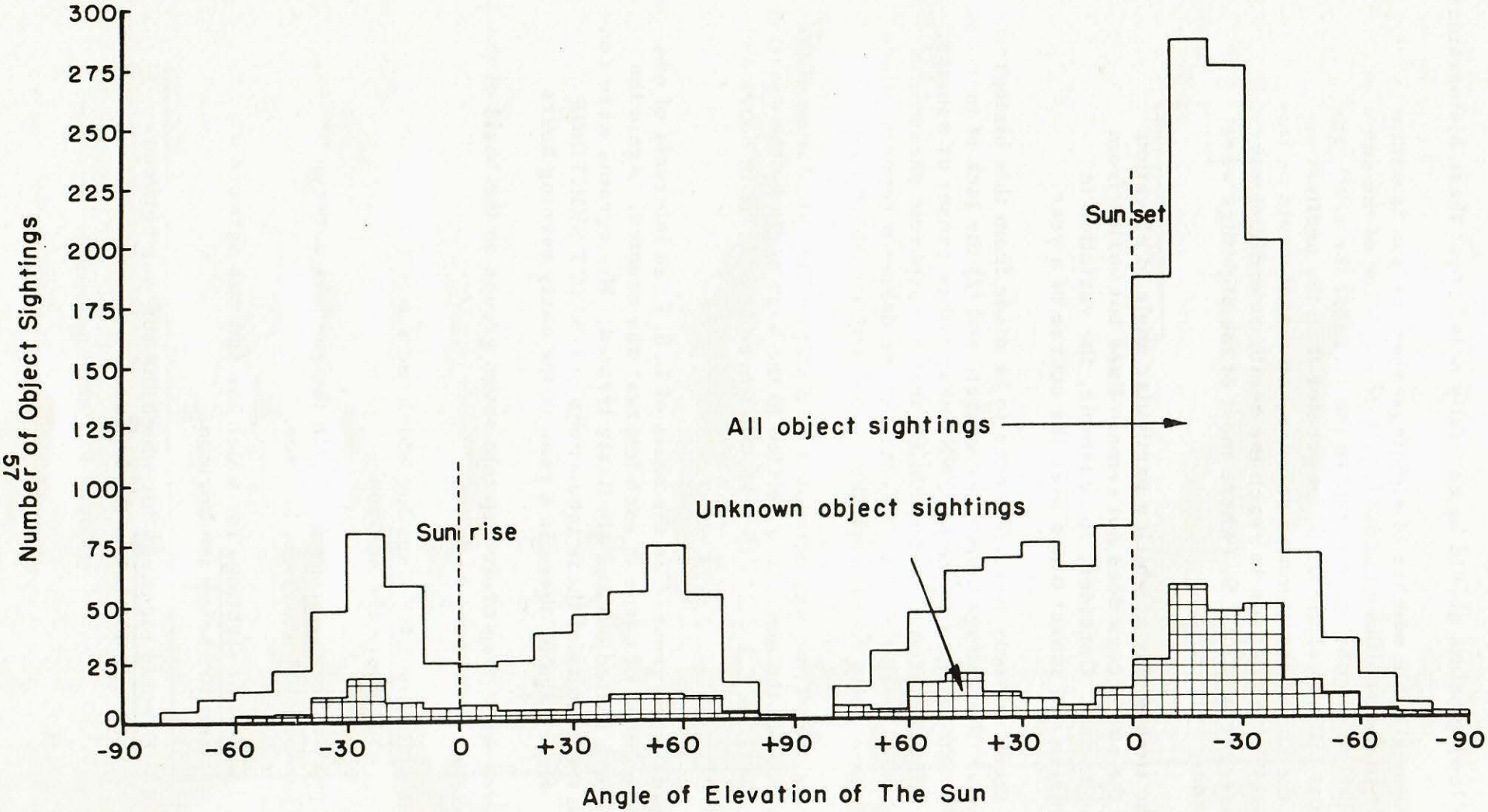

FIGURE 40 FREQUENCY OF OBJECT SIGHTINGS BY ANGLE OF ELEVATION OF THE SUN, INTERVALS OF 10 DEGREES OF ANGLE

A-7536

38

The following points should be carefully noted about these histograms:

(1) The negligible number of sightings when the sun is within 10° of the zenith and nadir (angle of elevation of the sun = ±90°) of the observer is due to the fact that the southernmost latitude of the U. S. is greater than the declination of the sun at the summer solstice, so that it would be impossible for the sun to reach the zenith or nadir of any observer in the U. S. (where most of the sightings were made).

(2) The time of day at which a particular angle of elevation of the sun occurs does not remain fixed but varies from day to day. Consider, for example, the variation in sunrise and sunset times over the course of a year.

Thus, there are only two inferences to be made from this histogram: (1) the high peak of sightings soon after sunset, and (2) the lack of increase in the UNKNOWNS relative to the KNOWNS near either sunset or sunrise. This would seem to discount the possibility that atmospheric phenomena such as mock suns were the primary cause of the unknown reports, since such phenomena usually occur when the sun is near the horizon.

The Local Sun Time was computed as a step in the calculation of the angle of elevation of the sun. It is related to the hour angle by the equation: Local Sun Time (L.S.T.) = HA/15 + 12.00, where L.S.T. is in hours and HA in degrees.

The cards were grouped on the basis of L.S.T. in intervals of one hour, and the number of cards in each interval was counted. Again the UNKNOWNS were sorted out and similarly treated. Histograms were constructed with the results of these tabulations of OBJECT SIGHTINGS (Figure 41). Here, again, there is a peak in the early evening hours.

The cards were then broken up into seven groups on the basis of the angle of elevation of the sun, as follows:

Group 1 – Daylight sightings for which the sun was more than 10° above the horizon.

Group 2 – Sunset sightings for which the sun was between 0° and 10° above the horizon.

Group 3 – Sunset sightings for which the sun was between 0° and 10° below the horizon.

Group 4 – Evening sightings for which the sun was between 10° and 40° below the horizon.

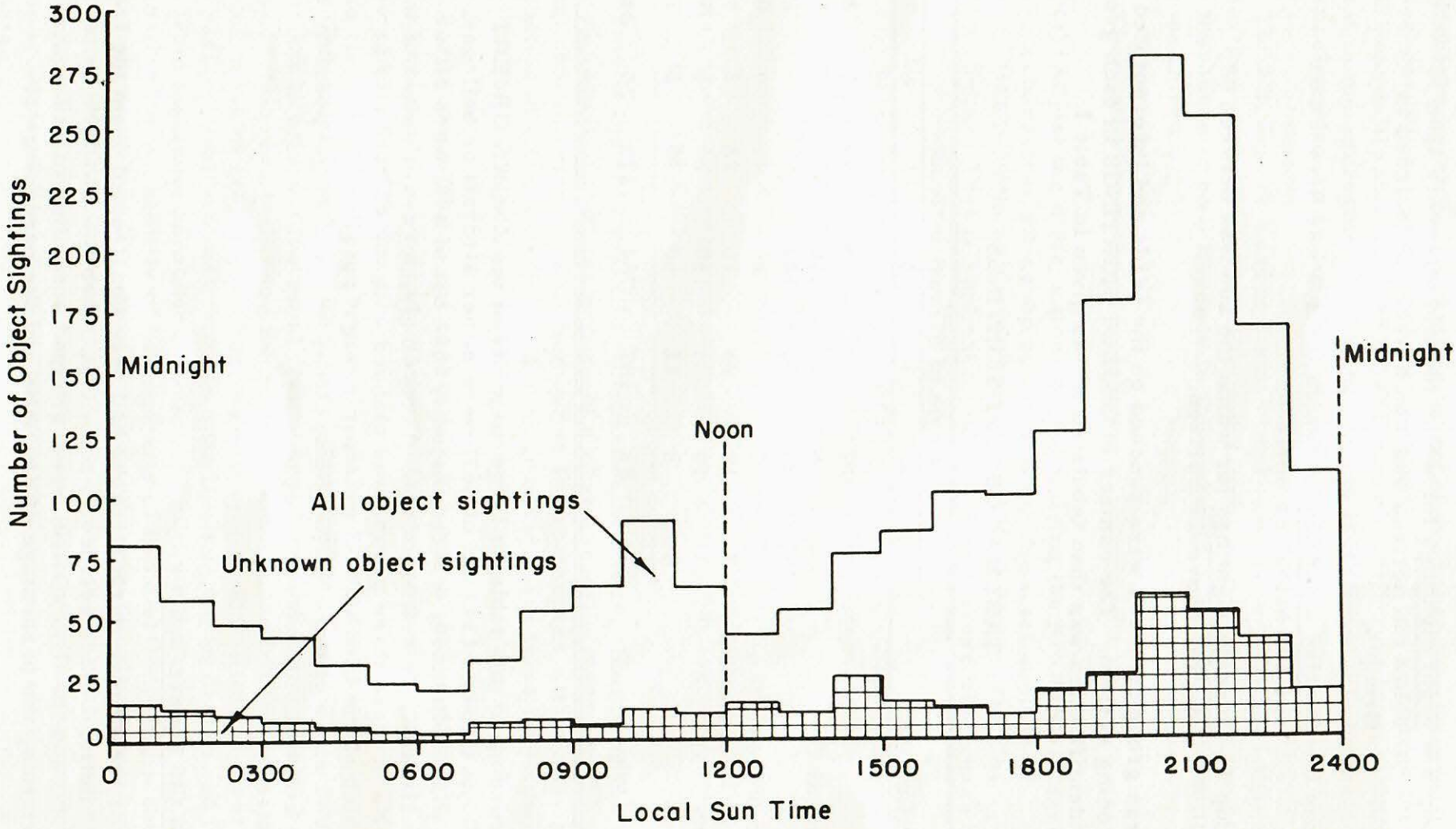

FIGURE 41 FREQUENCY OF OBJECT SIGHTINGS BY LOCAL SUN TIME, INTERVALS OF ONE HOUR

A-7537

Group 5 – Night sightings for which the sun was more than 10° below the horizon and which were not included in Group 4.

Group 6 – Sunrise sightings for which the sun was between 0° and 10° below the horizon.

Group 7 – Sunrise sightings for which the sun was between 0° and 10° above the horizon.

These group numbers were punched on the cards and incorporated into the coding system. The number of OBJECT SIGHTINGS in each group for each identification was then tabulated and is given in Table I.

TABLE I OBJECT SIGHTINGS

Identification	Angle of Elevation Group						
	1	2	3	4	5	6	7
Balloon	156	17	28	83	40	0	2
Astronomical	52	6	43	236	118	9	6
Aircraft	187	23	49	144	60	5	2
Light phenomena	8	2	4	25	7	0	0
Insufficient information	72	12	26	76	28	2	0
UNKNOWN	134	14	25	150	86	6	7
Other	64	8	12	50	36	3	7
Total	673	82	187	764	375	25	24

According to this table, a large majority of the KNOWN OBJECT SIGHTINGS in Group 1 (343 out of 467) were either aircraft or balloons. In Groups 4 and 5 combined, a large majority (681 out of 899) were either balloons, aircraft, or astronomical. Accordingly, a re-evaluation of the UNKNOWNS in these three groups was planned with the objective of determining which of the UNKNOWNS in Group 1 might possibly be aircraft or balloons and which of the UNKNOWNS in Groups 4 and 5 might possibly be balloons, aircraft, or astronomical objects. More will be said of this project later.

Statistical Chi Square Test

In the meantime, mirror graphs had been constructed from the frequency tabulations which seemed to show that, when the KNOWNS (total less UNKNOWNS) and the UNKNOWNS were grouped according to one of six characteristics, the percentage of KNOWNS and the percentage of

UNKNOWNS in each characteristic group showed the same general trend. In other words, on the basis of these graphs, it looked as though there was a good possibility that the UNKNOWNS were no different from the KNOWNS, at least in the aggregate. It was decided to investigate this by the use of a statistical procedure called the "Chi Square Test".

The Chi Square Test is a statistical test of the likelihood that two distributions come from the same population, that is, it gives the probability that there is no difference in the make-up of the two distributions being measured.

The method is outlined as follows:

(1) Adjust the distributions by multiplying the KNOWNS in each characteristic group by the ratio of the total number of UNKNOWNS to the total number of KNOWNS. (The Chi Square Test is applicable only to distributions which have the same total number of elements.)

(2) Take the difference between the number of UNKNOWNS and the adjusted number of KNOWNS in each characteristic group.

(3) Square the remainder from Step 2.

(4) Divide the result of Step 3 by the corresponding number of adjusted KNOWNS.

This is the chi square for the particular group. Summing the individual chi squares over the groups of a characteristic gives the chi square for that characteristic. This number is then compared with a table of the distribution of chi square which can be found in many texts on elementary statistics.

It will be noted that chi square is tabulated in terms of degrees of freedom which in this case is one less than the number of groups of sightings for each characteristic.

The tabulations of KNOWNS and UNKNOWNS against the six characteristics and the Chi Square Test as it was applied are shown in Tables II through VII. In each case, the number of degrees of freedom is given, as is the value of chi squares corresponding to probabilities of 5 per cent and 1 per cent that two distributions with this number of degrees of freedom come from the same population. Since the greater the value of chi square the smaller the probability of homogeneity of two distributions, a calculated value of chi square greater than either the 5 per cent or 1 per cent values will indicate a probability less than 5 per cent or 1 per cent, respectively, that the two distributions are homogeneous. The term homogeneity is used here to indicate that two distributions could have come from the same population.



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In five of the six cases, the probability is less than 1 per cent that the distributions are the same. In the sixth case, Light Brightness, the classifications are too nebulous to be of real value. However, these tests do not necessarily mean that the UNKNOWNS are primarily "flying saucers" and not aircraft, balloons, or other known objects or natural phenomena. The UNKNOWNS might still be unidentified KNOWNS if either of the following cases occurred:

(1) The characteristics which were observed for the UNKNOWNS were different from those observed for the KNOWNS because of the psychological make-up of the observer or because of atmospheric distortion. This assumes the distribution of objects in KNOWNS and UNKNOWNS is the same.

(2) The UNKNOWNS may be known objects in different proportions than the group identified as KNOWNS. (That is, a greater percentage of the UNKNOWNS could be aircraft than the percentage of aircraft in the identified KNOWNS.)

The second case is the more probable one. In this connection, it is interesting to note the factors which contributed to a large chi square result in the tests made above:

(1) Color

The major contribution to chi square in color is from the color green. There is a large excess of green sightings among the KNOWNS over the UNKNOWNS. Of the 130 known objects in this classification, 98 are astronomical, and are due mostly to the green fireballs reported from the Southwest U. S.

(2) Number

The large chi square is due to a greater proportion of UNKNOWNS in the multiple object classification. Apparently these are harder to identify.

(3) Shape

In this case, there is a higher percentage of UNKNOWNS in the rocket-aircraft-shape classification. These might be familiar objects for which unusual maneuvers were reported.

There is a higher percentage of KNOWNS in the flame and in the meteor- or comet-shape category, which in both cases appears to result mainly from excesses of astronomical sightings.

(4) Duration of observation

Here there is an excess of KNOWNS in the less-than-5-second group. Again, the majority of KNOWNS in this group are astronomical. The greater proportion of UNKNOWNS in the 31- to 60-second and 61-second to 5-minute groups cannot be explained.

(5) Speed

The major contribution to chi square for this characteristic is due to a large excess of UNKNOWNS in the over 400-mph class. It can be assumed that some of the excessive speeds are inaccuracies in estimates by observers. However, some radar sightings, which are practically impossible to identify, show objects with speeds of 1,000 to 2,000 mph and over, and these reports account for a number of these UNKNOWNS.

(6) Light brightness

Since this chi square was not significant, it is not necessary to discuss it here.

An examination of these discrepancies thus brings up a very interesting point. In every case for which there is a significant excess of KNOWNS over UNKNOWNS, the excess can be attributed to an excess of identifiable astronomical phenomena. This would seem to lead to the conclusion that astronomical phenomena are easy to identify and there are very few left in the UNKNOWNS. Accordingly, the astronomical object sightings were deleted from the KNOWN object sightings and the Chi Square Test was again applied. The results are shown in Tables VIII through XIII, where in this case the KNOWNS do not contain astronomical sightings.

It will be noted that some groups were combined when the adjusted number of KNOWNS was ten or less, except for the case for which the number of objects per sighting was the characteristic studied. These were borderline cases, and no good combination of groups existed.

It is apparent that the deletion of astronomical sightings gives a better fit, although the decision is not clear cut, since for two cases (light brightness and speed), the chi square increased. However, it can again be pointed out that the reporting of these two characteristics is highly subjective and is open to question. The estimation of speed is especially open to question because of the impossibility of accurately determining it visually.

Another interesting aspect of these new tests is that there are only two large discrepancies in all of the groups. These are for the 11 or more groups in the classification by number of objects per sighting and for the over-400-mph and meteor-like group for the classification by speed. The first was relatively unchanged by deletion of the astronomical sightings principally because of the concentration of sightings in the single-object category. The second was slightly increased by the removal of the astronomical sightings from the meteor-like classification. However, the main discrepancy, that of the excess of UNKNOWNS in the over-400-mph class, was little changed.

The results of these tests are inconclusive since they neither confirm nor deny that the UNKNOWNS are primarily unidentified KNOWNS, although they do indicate that relatively few of the UNKNOWNS are actually astronomical phenomena.

It was decided that this process would not be carried to its logical conclusion (that is, the determination of a linear combination of KNOWNS that would give a negligible chi square when compared with the UNKNOWNS), since it was felt that the inaccuracies in the reports would give a distorted and meaningless result.

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TABLE II CHI SQUARE TEST OF KNOWNS VERSUS UNKNOWNS ON THE BASIS OF COLOR

Color	Number of KNOWNS	Adjusted Number of KNOWNS (K)	Number of UNKNOWNS (n)	X^2, $\frac{(K-n)^2}{K}$
White	405	100	112	1.44
Metallic	313	77	76	0.01
Not stated	209	51	62	2.37
Orange	172	42	49	1.17
Red	146	36	33	0.25
Yellow	128	31	31	0
Green	130	32	14	10.13
Blue	67	17	26	4.76
Other	195	48	31	6.02
Total	1765	434	434	26.15
Degrees of freedom				8
5%				15.5
1%				20.1

TABLE III CHI SQUARE TEST OF KNOWNS VERSUS UNKNOWNS ON THE BASIS OF NUMBER

Number of Objects Per Sighting	Number of KNOWNS	Adjusted Number of KNOWNS (K)	Number of UNKNOWNS (n)	X^2, $\frac{(K-n)^2}{K}$
1	1339	329	297	3.11
2	159	39	37	0.10
3-10	185	46	70	12.52
11 or more	41	10	25	22.50
Not stated	41	10	5	2.50
Total	1765	434	434	40.73
Degrees of freedom				4
5%				9.5
1%				13.3

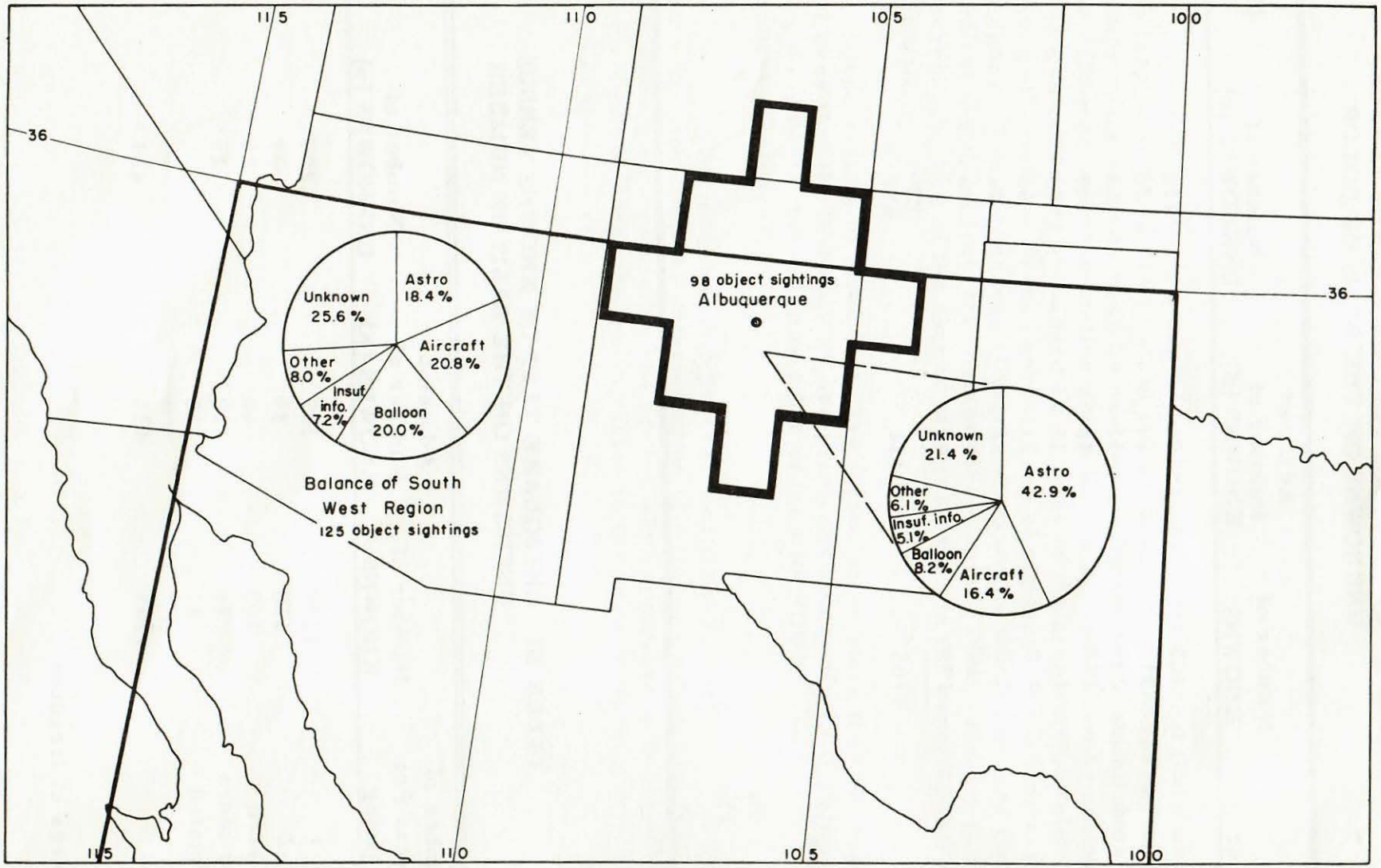


FIGURE 37 COMPARISON OF EVALUATION OF OBJECT SIGHTINGS IN THE STRATEGIC AREAS OF THE SOUTH WEST REGION

A-7515

TABLE IV CHI SQUARE TEST OF KNOWNS VERSUS UNKNOWNS ON THE BASIS OF SHAPE

Shape	Number of KNOWNS	Adjusted Number of KNOWNS (K)	Number of UNKNOWNS (n)	X^2, $\frac{(K-n)^2}{K}$
Elliptical	838	206	195	0.59
Rocket and aircraft	80	20	33	8.45
Meteor or comet	55	14	4	7.14
Teardrop, lenticular, or conical	103	25	22	0.36
Flame	96	24	10	8.17
Other	193	47	54	1.04
Not stated	400	98	116	3.30
Total	1765	434	434	29.05
Degrees of freedom				6
5%				12.6
1%				16.8

TABLE V CHI SQUARE TEST OF KNOWNS VERSUS UNKNOWNS ON THE BASIS OF DURATION OF OBSERVATION

Duration of Observation	Number of KNOWNS	Adjusted Number of KNOWNS (K)	Number of UNKNOWNS (n)	X^2, $\frac{(K-n)^2}{K}$
5 sec or less	259	64	27	21.39
6-10 sec	92	23	21	0.17
11-30 sec	153	38	33	0.66
31-60 sec	108	26	42	9.85
61 sec-5 min	269	66	99	16.50
6-30 min	305	75	71	0.21
Over 30 min	135	33	37	0.48
Not stated	444	109	104	0.23
Total	1765	434	434	49.49
Degrees of freedom				7
5%				14.1
1%				18.5

TABLE VI CHI SQUARE TEST OF KNOWNS VERSUS UNKNOWNS ON THE BASIS OF SPEED

Speed	Number of KNOWNS	Adjusted Number of KNOWNS (K)	Number of UNKNOWNS (n)	X^2, $\frac{(K-n)^2}{K}$
Stationary	249	61	53	1.05
Less than 100 mph	154	38	26	3.79
100 to 400 mph	181	45	58	3.76
Over 400 mph	403	99	145	21.37
Meteor-like	83	20	16	0.80
Not stated	695	171	136	7.16
Total	1765	434	434	37.93
Degrees of freedom				5
5%				11.1
1%				15.1

TABLE VII CHI SQUARE TEST OF KNOWNS VERSUS UNKNOWNS ON THE BASIS OF LIGHT BRIGHTNESS

Light Brightness	Number of KNOWNS	Adjusted Number of KNOWNS (K)	Number of UNKNOWNS (n)	X^2, $\frac{(K-n)^2}{K}$
Sunlight on mirror	47	11	14	0.82
Sunlight on aluminum	151	37	28	2.19
Sunlight on plaster, stone, or soil	76	19	16	0.47
Brighter than moon	273	67	61	0.55
Like moon or duller than moon	68	17	22	1.47
Not stated	1150	283	293	0.35
Total	1765	434	434	5.85
Degrees of freedom				5
5%				11.1
1%				15.1

TABLE VIII CHI SQUARE TEST OF REVISED KNOWNS VERSUS UNKNOWNS ON THE BASIS OF COLOR

Color	Number of KNOWNS	Adjusted Number of KNOWNS (K)	Number of UNKNOWNS (n)	X^2, $\frac{(K-n)^2}{K}$
White	281	95	112	3.04
Metallic	298	101	76	6.19
Not stated	189	64	62	0.06
Orange	117	39	49	2.56
Red	92	31	33	0.13
Yellow	90	30	31	0.03
Green	32	11	14	0.82
Blue	29	10	26	0.57
Other	158	53	31	
Total	1286	434	434	13.40
Degrees of freedom				7
5%				14.1
1%				18.5

TABLE IX CHI SQUARE TEST OF REVISED KNOWNS VERSUS UNKNOWNS ON THE BASIS OF NUMBER

Number of Objects Per Sighting	Number of KNOWNS	Adjusted Number of KNOWNS (K)	Number of UNKNOWNS (n)	X^2, $\frac{(K-n)^2}{K}$
1	913	308	297	0.39
2	142	48	37	2.52
3-10	168	57	70	2.96
11 or more	34	11	25	15.36
Not stated	29	10	5	2.50
Total	1286	434	434	23.73
Degrees of freedom				4
5%				9.5
1%				13.3

TABLE X CHI SQUARE TEST OF REVISED KNOWNS VERSUS UNKNOWNS ON THE BASIS OF SHAPE

Shape	Number of KNOWNS	Adjusted Number of KNOWNS (K)	Number of UNKNOWNS (n)	X^2, $\frac{(K-n)^2}{K}$
Elliptical	632	213	195	1.52
Rocket or aircraft	72	24	33	3.37
Meteor or comet	9	3	4	1.32
Flame	47	16	10	
Teardrop, lenticular, or conical	79	27	22	0.93
Other	151	51	54	1.76
Not stated	296	100	116	2.56
Total	1286	434	434	11.46
Degrees of freedom				5
5%				11.1
1%				15.1

TABLE XI CHI SQUARE TEST OF REVISED KNOWNS VERSUS UNKNOWNS ON THE BASIS OF DURATION OF OBSERVATION

Duration of Observation	Number of KNOWNS	Adjusted Number of KNOWNS (K)	Number of UNKNOWNS (n)	X^2, $\frac{(K-n)^2}{K}$
5 sec or less	92	31	27	0.52
6-10 sec	47	16	21	1.56
11-30 sec	118	40	33	1.23
31-60 sec	92	31	42	3.90
61 sec-5 min	252	85	99	2.31
6 min-30 min	259	87	71	2.94
Over 30 min	91	31	37	1.16
Not stated	335	113	104	0.72
Total	1286	434	434	14.34
Degrees of freedom				7
5%				14.1
1%				18.5

TABLE XII CHI SQUARE TEST OF REVISED KNOWNS VERSUS UNKNOWNS ON THE BASIS OF SPEED

Speed	Number of KNOWNS	Adjusted Number of KNOWNS (K)	Number of UNKNOWNS (n)	X^2, $\frac{(K-n)^2}{K}$
Stationary	196	66	53	2.56
Less than 100 mph	128	43	26	6.72
100 to 400 mph	156	53	58	0.47
Over 400 mph	291	98	145	28.54
Meteor-like	24	8	16	
Not stated	491	166	136	5.42
Total	1286	434	434	43.71
Degrees of freedom				4
5%				9.5
1%				13.3

TABLE XIII CHI SQUARE TEST OF REVISED KNOWNS VERSUS UNKNOWNS ON THE BASIS OF LIGHT BRIGHTNESS

Light Brightness	Number of KNOWNS	Adjusted Number of KNOWNS (K)	Number of UNKNOWNS (n)	X^2, $\frac{(K-n)^2}{K}$
Sunlight on mirror	24	8	14	2.67
Sunlight on aluminum	136	46	28	
Sunlight on plaster, stone, or soil	63	21	16	1.19
Brighter than moon	143	48	61	3.52
Like moon or duller than moon	42	15	22	3.27
Not stated	878	296	293	0.03
Total	1286	434	434	10.68
Degrees of freedom				4
5%				9.
1%				13.3

.50

The "Flying Saucer" Model

The importance of the problem dictated a second approach, should the statistical results prove inconclusive. It was decided that an attempt would be made to describe the physical appearance, flight characteristics, and other attributes (that is, construct a model) of a class or classes of "flying saucers".

Preparatory to this attempt, a re-evaluation of the UNKNOWNS was necessary. This re-evaluation was accomplished by a panel composed only of persons previously associated with the work. Using all the UNKNOWNS reports available at ATIC, the panel made a careful study of the reports for the UNKNOWN SIGHTINGS in angle-of-sun-elevation Groups 1, 2, 3, 6, and 7 – those groups for which the sun was either above the horizon or less than 10° in elevation below the horizon.

This study had two purposes. The first was to determine, with additional information such as the angle of elevation of the sun, how many of the UNKNOWNS might be ascribed to known phenomena. The second was to obtain those UNKNOWNS which were described in sufficient detail that they might be used to construct a model or models of "flying saucers".

It was decided to put any of the UNKNOWNS which might be known phenomena into a "possible KNOWN" category to denote the slightly lower confidence level which could be ascribed to these new evaluations. The

UNKNOWNS with sufficiently detailed description would be called "good UNKNOWNS", while the remainder would simply be called UNKNOWNS. One hundred sixty-four folders of a total of 186 OBJECT SIGHTINGS in Groups 1, 2, 3, 6, and 7 were examined. There were 18 possible aircraft, 20 possible balloons, 7 good UNKNOWNS, 100 UNKNOWNS, and 19 others which were identified as being possible KNOWNS of various types. It is interesting to note that two of these were established as mock suns on the basis of the angle of sun elevation and the sun bearing angle, together with the direction of the object from the observer. In addition, the UNKNOWNS in angle-of-sun-elevation Groups 4 and 5 (nighttime sightings) were scanned with no attempt at identification, but to find any possible "good UNKNOWNS" There were five sightings that could be put into this category.

Of the UNKNOWNS, there were approximately 20 sightings that were observed in such a way that they should have been recognized easily if they had been familiar objects, that is, there was little possibility that their shapes, as seen, could have been distorted sufficiently by one cause or another to render them unrecognizable. There were a very few that would have been identified as guided missiles or rockets, but that were not so identified because of the geographical location in which they were seen.

All of the remaining UNKNOWNS were classified as such solely because they were reported to have performed maneuvers that could not be ascribed to any known objects. In these cases, the shape might have been unrecognizable also, but it was felt that this was because of distortion and distance, or because of darkness.

This is a very important point. To put it differently, if these UNKNOWNS, which represent all but about 40 of the UNKNOWN SIGHTINGS, were reported to have performed maneuvers which could be ascribed to known phenomena, they would probably have been identified as KNOWNS. With the exception of some radar sightings, all of these maneuvers were observed visually. The possibilities for inaccuracies are great because of the inability of an observer to estimate visually size, distance, and speed.

Reports of sightings by radar usually were of high-speed objects, some at extremely high altitudes. Some were identified as UNKNOWNS because there was no object to be seen visually at the point indicated by the radar set. It cannot be said with any assurance what these radar sightings mean, but the most logical explanation is that they are ground targets reflected by an atmospheric temperature inversion layer. The validity of this statement cannot be established. It is felt that radar sightings in this study are of no significance whatsoever unless a visual sighting of the object also is made.

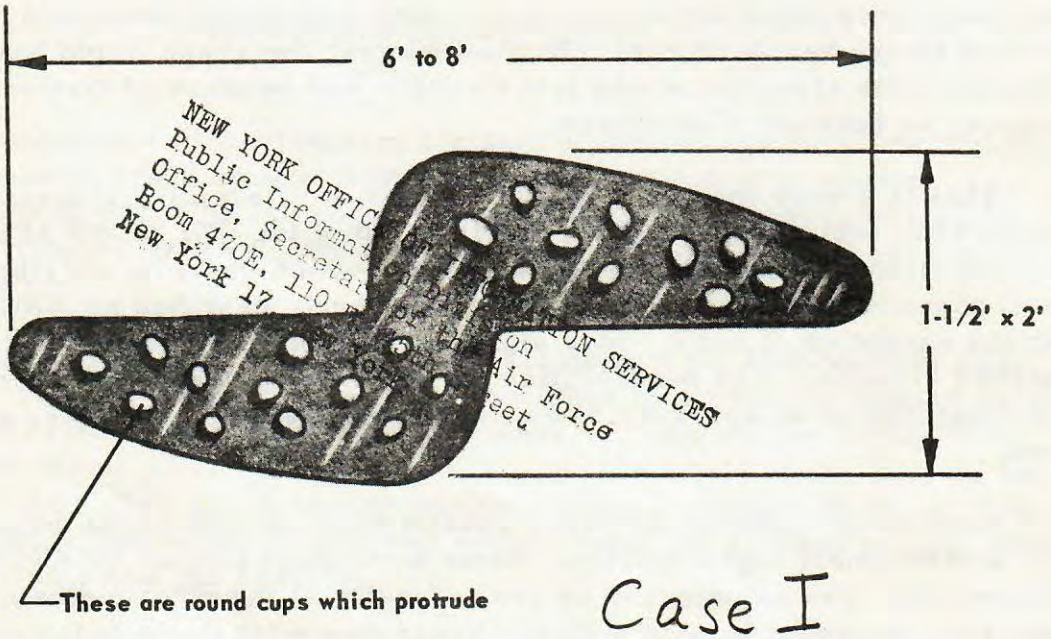
Taken in conjunction with the Chi Square Tests discussed earlier, the results of the re-evaluation of reports identified as UNKNOWN SIGHTINGS would seem to indicate that the majority of them could easily

have been familiar objects. However, the resolution of this question with any degree of certainty appears to be impossible.

Thus, out of the 434 OBJECT SIGHTINGS that were identified as UNKNOWNS by the data reduction process, there were only 12 that were described with sufficient detail that they could be used in an attempt to derive a model of a "flying saucer". The following is a summary of the 12 good UNKNOWN SIGHTINGS:

Case I (Serial 0573.00)

Two men employed by a rug-cleaning firm were driving across a bridge at 0955 hours on July 29, 1948, when they saw an object glide across the road a few hundred feet in front of them. It was shiny and metallic in construction, about 6 to 8 feet long and 2 feet wide. It was in a flat glide path at an altitude of about 30 feet and in a moderate turn to the left. It was seen for only a few seconds and apparently went down in a wooded area, although no trace of it was found.

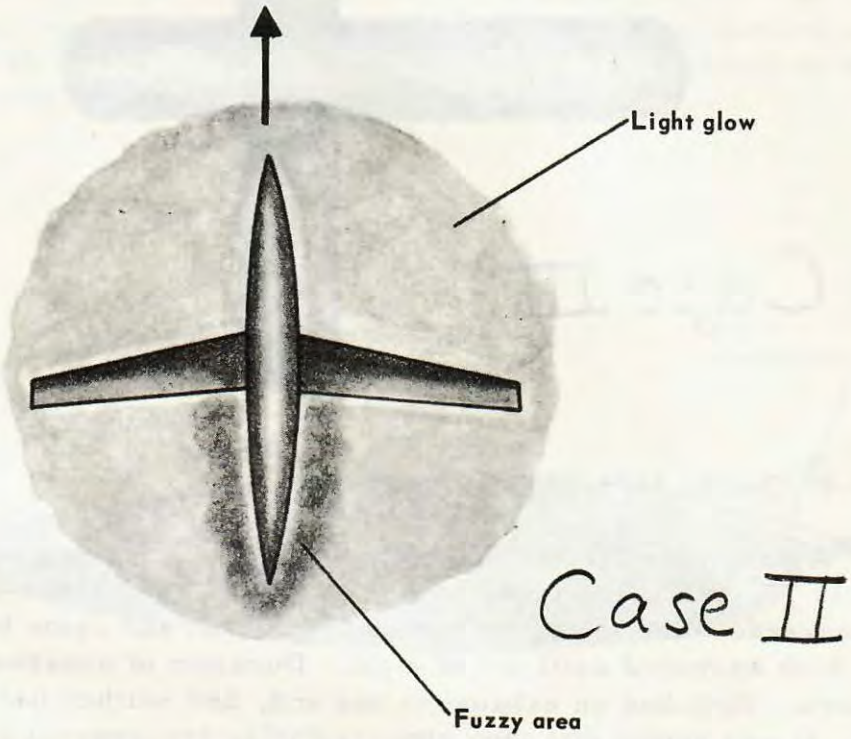


Case II (Serial 4508.00)

A naval aviation student, his wife, and several others were at a drive-in movie from 2115 to 2240 hours on April 20, 1952, during which time they saw several groups of objects fly over. There were from two to nine objects in a group and there were about 20 groups. The groups of

objects flew in a straight line except for some changes in direction accomplished in a manner like any standard aircraft turn.

The objects were shaped like conventional aircraft. The unaccountable feature of the objects was that each had a red glow surrounding it and was glowing itself, although it was a cloudless night.



Case II

Case III (Serial 2013.00, 2014.00, and 2014.01)

Two tower operators sighted a light over a city airport at 2020 hours on January 20, 1951. Since a commercial plane was taking off at this time, the pilots were asked to investigate this light. They observed it at 2026 hours. According to them, it flew abreast of them at a greater radius as they made their climbing turn, during which time it blinked some lights which looked like running lights. While the observing plane was still in its climbing turn, the object made a turn toward the plane and flew across its nose. As the two men turned their heads to watch it, it instantly appeared on their other side flying in the same direction as they were flying, and then in 2 or 3 seconds it slipped under them, and they did not see it again. Total time of the observation was not stated. In appearance, it was like an airplane with a cigar-shaped body and straight wings, somewhat larger than a B-29. No engine nacelles were observed on the wings.

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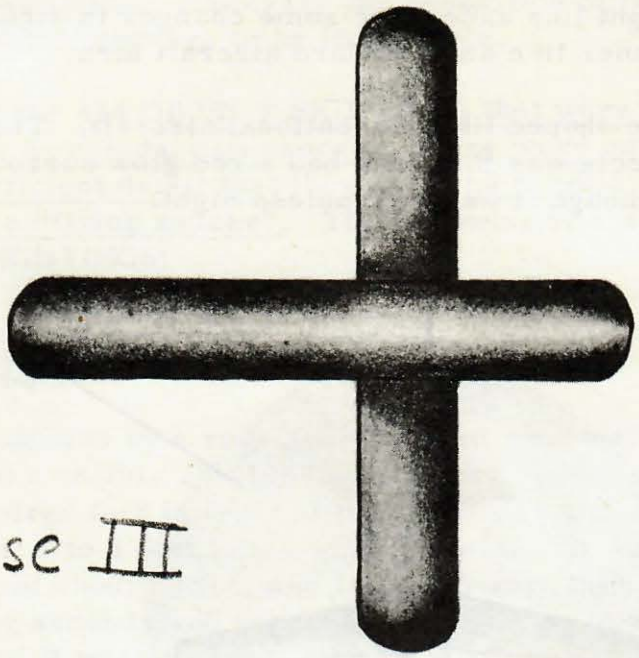
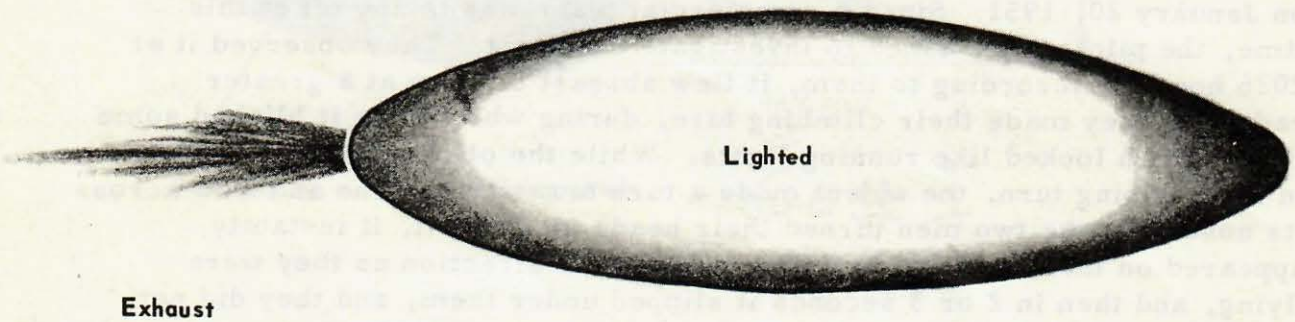


Case III

Case IV (Serial 4599.00)

A part-time farmer and a hired hand were curing tobacco at midnight on July 19, 1952, when they looked up and saw two cigar-shaped objects. One hovered while the other moved to the east and came back, at which time both ascended until out of sight. Duration of observation was 3 to 4 minutes. Both had an exhaust at one end, and neither had projections of any kind. It was stated that they appeared to be transparent and illuminated from the inside.

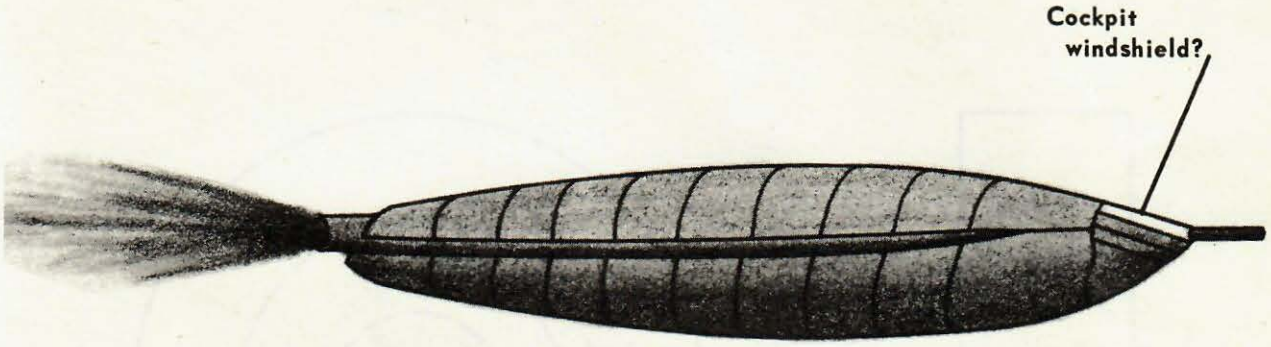


Case IV

55

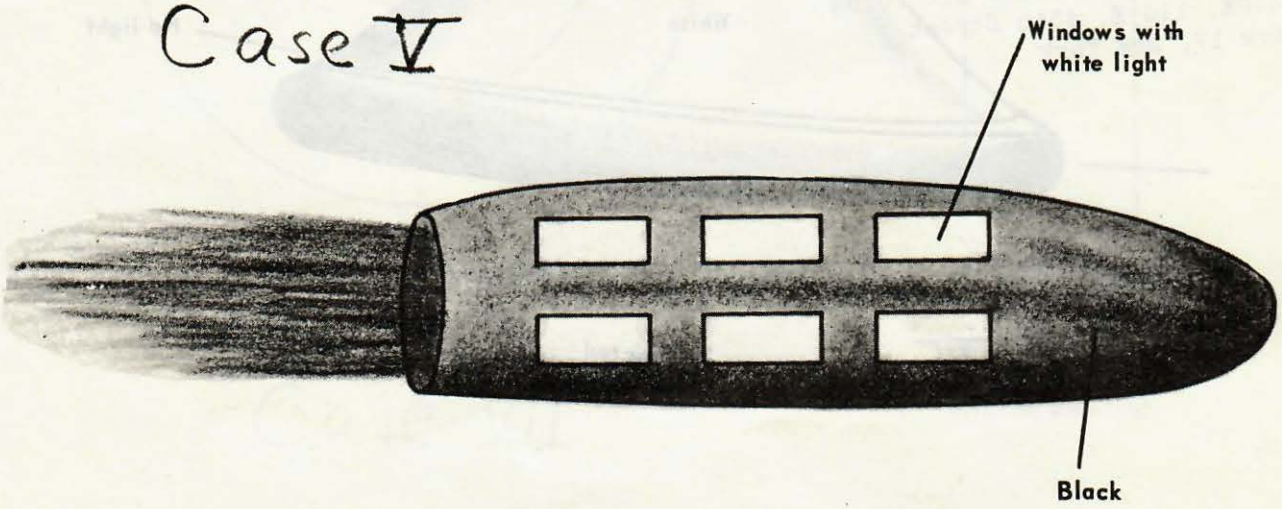
Case V (Serial 0565.00 to 0565.03)

A pilot and copilot were flying a DC-3 at 0340 hours on July 24, 1948, when they saw an object coming toward them. It passed to the right and slightly above them, at which time it went into a steep climb and was lost from sight in some clouds. Duration of the observation was about 10 seconds. One passenger was able to catch a flash of light as the object passed. The object seemed powered by rocket or jet motors shooting a trail of fire some 50 feet to the rear of the object. The object had no wings or other protrusion and had two rows of lighted windows.



Pilot

Case V



Copilot

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Case VI (Serial 4822.00)

An instrument technician, while driving from a large city toward an Air Force base on December 22, 1952, saw an object from his car at 1930 hours. He stopped his car to watch it. It suddenly moved up toward the zenith in spurts from right to left at an angle of about 45°. It then moved off in level flight at a high rate of speed, during which maneuver it appeared white most of the time, but apparently rolled three times showing a red side. About halfway through its roll it showed no light at all. It finally assumed a position to the south of the planet Jupiter at a high altitude, at which position it darted back and forth, left and right alternately. Total time of the observation was 15 minutes. Apparently, the observer just stopped watching the object.

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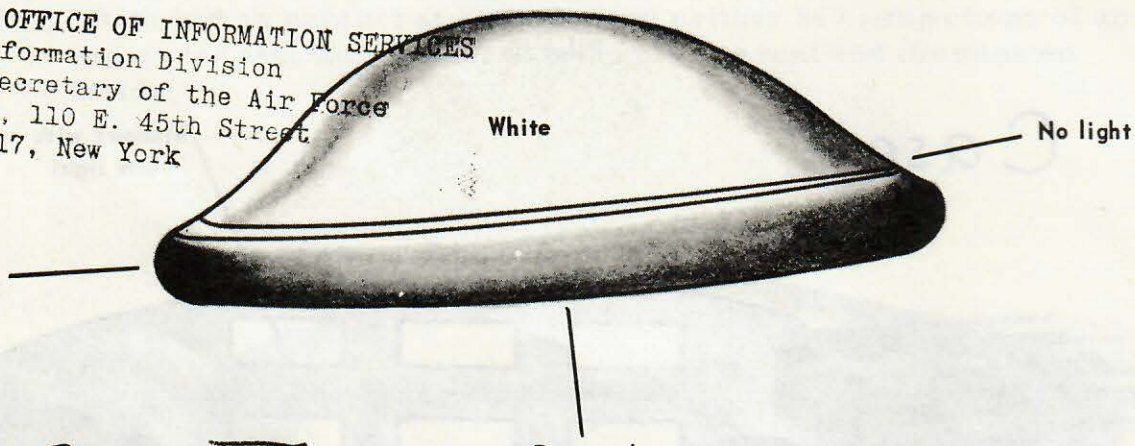

Case VI

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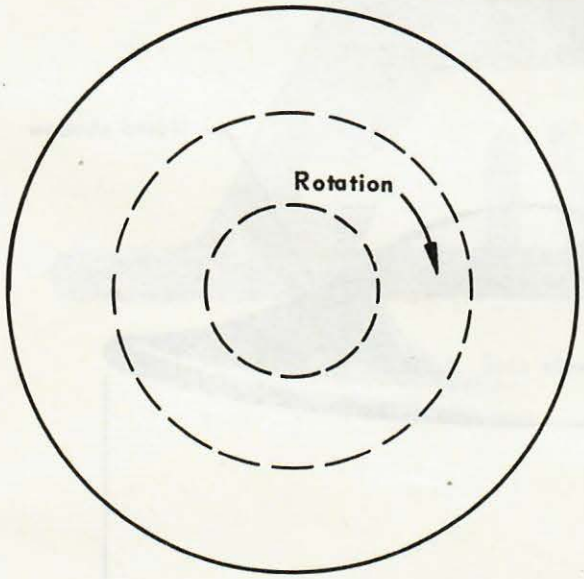
Case VII (Serial 2728.00)

A Flight Sergeant saw an object over an Air Force base in Korea at 0842 hours on June 6, 1952. The object flew in a series of spinning and tumbling actions. It was on an erratic course, first flying level, then stopping momentarily, shooting straight up, flying level and again tumbling, then changing course and disappearing into the sun. It reappeared and was seen flying back and forth across the sun. At one time an F-86 passed between the observer and the object. He pointed it out to another man who saw it as it maneuvered near the sun.



Black lines evenly spaced



Proportion 7 to 1

(Dimensions are as shown in observer's original drawing)

Case VII

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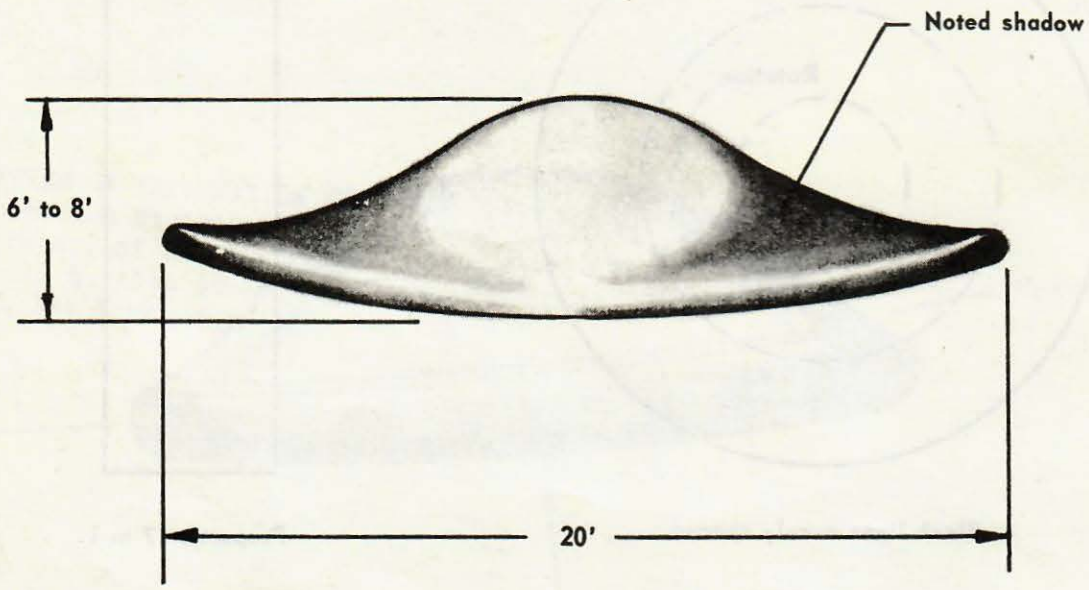
Case VIII (Serial 0576.00)

An electrician was standing by the bathroom window of his home, facing west, at 0825 hours on July 31, 1948, when he first sighted an object. He ran to his kitchen where he pointed out the object to his wife. Total time in sight was approximately 10 seconds, during which the object flew on a straight and level course from horizon to horizon, west to east.

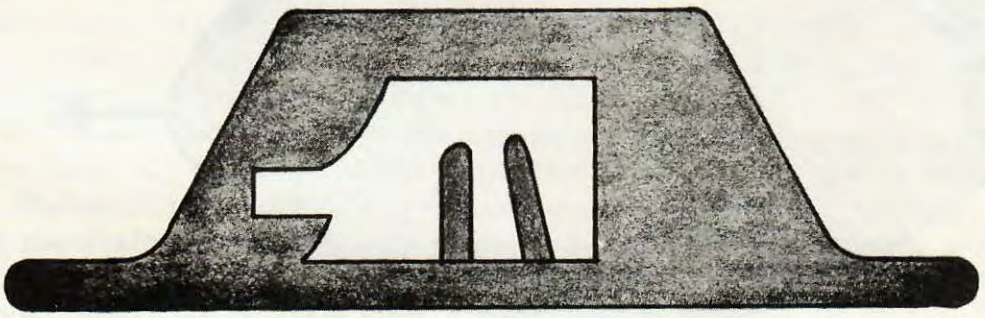


Case VIII

(Ratio approx. 3:1)

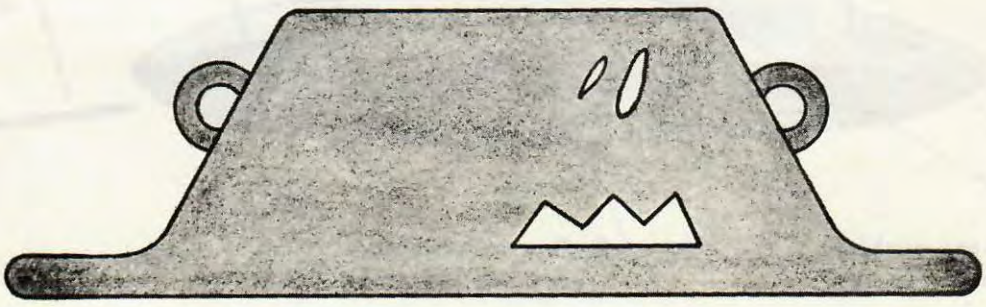
Case IX (Serial 0066.00)

A farmer and his two sons, aged 8 and 10, were at his fishing camp on August 13, 1947. At about 1300 hours, he went to look for the boys, having sent them to the river for some tape from his boat. He noticed an object some 300 feet away, 75 feet above the ground. He saw it against the background of the canyon wall which was 400 feet high at this point. It was hedge hopping, following the contour of the ground, was sky blue, about 20 feet in diameter and 10 feet thick, and had pods on the side from which flames were shooting out. It made a swishing sound. The observer stated that the trees were highly agitated by the craft as it passed over. His two sons also observed the object. No one saw the object for more than a few seconds.



Side view

Case IX

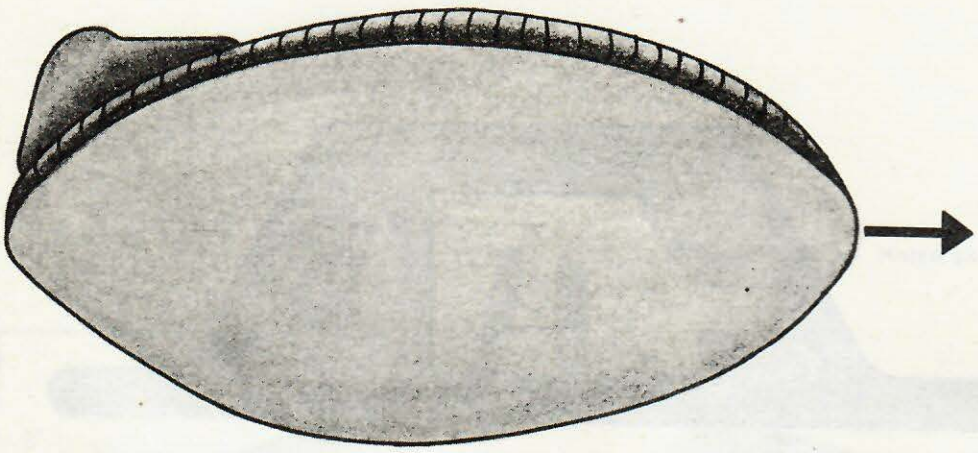


End view

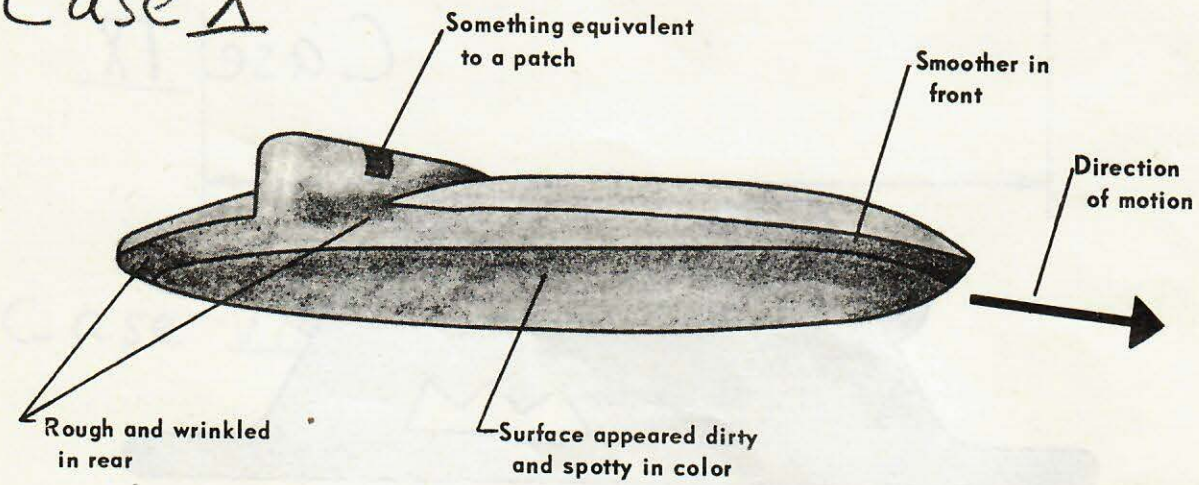
60

Case X (Serial 1119.00)

An employee in the supersonic laboratory of an aeronautical laboratory and some other employees of this lab, were by a river, 2-1/2 miles from its mouth, when they saw an object. The time was about 1700 hours on May 24, 1949. The object was reflecting sunlight when observed by naked eye. However, he then looked at it with 8-power binoculars, at which time there was no glare. (Did glasses have filter?) It was of metallic construction and was seen with good enough resolution to show that the skin was dirty. It moved off in horizontal flight at a gradually increasing rate of speed, until it seemed to approach the speed of a jet before it disappeared. No propulsion was apparent. Time of observation was 2-1/2 to 3 minutes.



Case X



Case XI (Serial 1550.00)

On March 20, 1950, a Reserve Air Force Captain and an airlines Captain were flying a commercial airlines flight. At 21:26, the airline Captain directed the attention of the Reserve Air Force Captain to an object which apparently was flying at high speed, approaching the airliner from the south on a north heading. The Reserve Air Force Captain focused his attention on the object. Both crew members watched it as it passed in front of them and went out of sight to the right. The observation, which lasted about 25 to 35 seconds, occurred about 15 miles north of a medium-sized city. When the object passed in front of the airliner, it was not more than 1/2 mile distant and at an altitude of about 1000 feet higher than the airliner.

The object appeared to be circular, with a diameter of approximately 100 feet and with a vertical height considerably less than the diameter, giving the object a disc-like shape. In the top center was a light which was blinking at an estimated 3 flashes per second. This light was so brilliant that it would have been impossible to look at it continuously had it not been blinking. This light could be seen only when the object was approaching and after it had passed the airliner. When the object passed in front of the observers, the bottom side was visible. The bottom side appeared to have 9 to 12 symmetrical oval or circular portholes located in a circle approximately 3/4 of the distance from the center to the outer edge. Through these portholes came a soft purple light about the shade of aircraft fluorescent lights. The object was traveling in a straight line without spinning. Considering the visibility, the length of time the object was in sight, and the distance from the object, the Reserve Air Force Captain estimates the speed to be in excess of 1000 mph.

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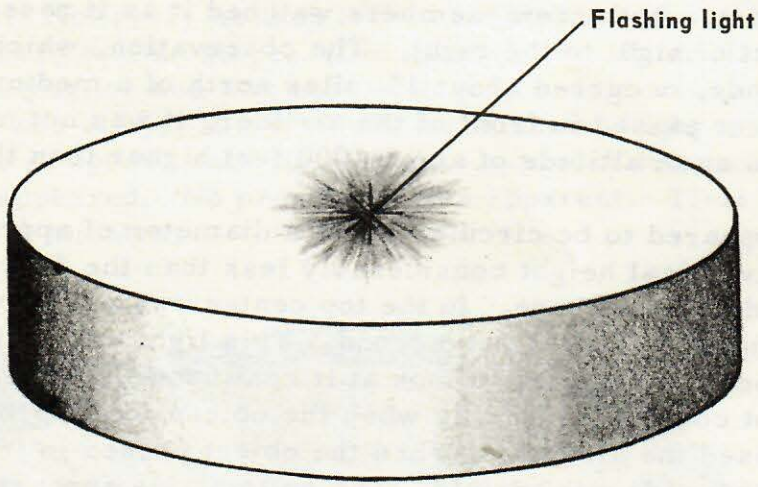
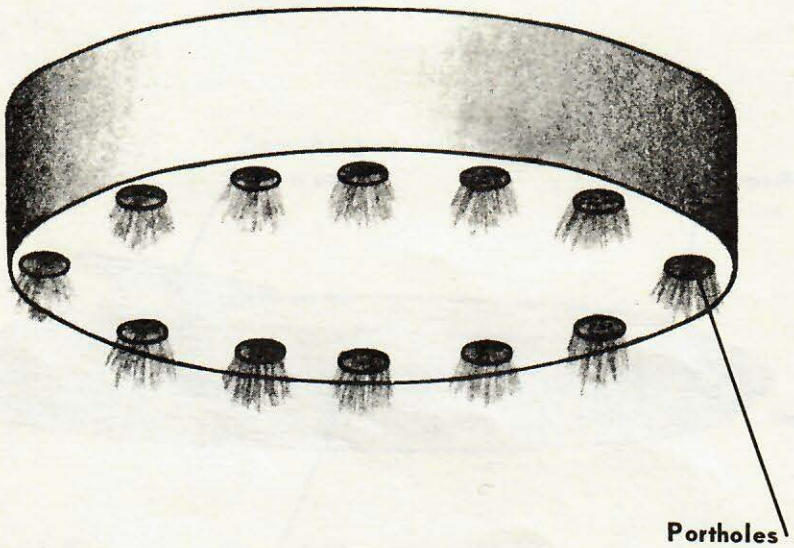


Case XI



Case XII (Serial 3601.00)

At 0535 on the morning of August 25, 1952, a musician for a radio station was driving to work from his home when he noticed an object hovering about 10 feet above a field near the road along which he was driving. As he came abreast of the object, he stopped his car and got out to watch. Having an artificial leg, he could not leave the road, since the surrounding terrain was rough. However, he was within about 100 yards of it at the point he was standing on the road. The object was not absolutely still, but seemed to rock slightly as it hovered. When he turned off the motor of his car, he could hear a deep throbbing sound coming from the object. As he got out of the car, the object began a vertical ascent with a sound similar to "a large covey of quail starting to fly at one time". The object ascended vertically through broken clouds until out of sight. His view was not obscured by clouds. The observer states that the vegetation was blown about by the object when it was near the ground.

Description of the object is as follows:

It was about 75 feet long, 45 feet wide, and 15 feet thick, shaped like two oval meat platters placed together. It was a dull aluminum color, and had a smooth surface. A medium-blue continuous light shone through the one window in the front section. The head and shoulders of one man, sitting motionless, facing the forward edge of the object, were visible. In the midsection of the object were several windows extending from the top to the rear edge of the object; the midsection of the ship had a blue light which gradually changed to different shades. There was a large amount of activity and movement in the midsection that could not be identified as either human or mechanical, although it did not have a regular pattern of movement. There were no windows, doors or portholes, vents, seams, etc., visible to the observer in the rear section of the object or under the object (viewed at time of ascent). Another identifiable feature was a series of propellers 6 to 12 inches in diameter spaced closely together along the outer edge of the object. These propellers were mounted on a bracket so that they revolved in a horizontal plane along the edge of the object. The propellers were revolving at a high rate of speed.

Investigation of the area soon afterward showed some evidence of vegetation being blown around. An examination of grass and soil samples taken indicated nothing unusual. Reliability of the observer was considered good.

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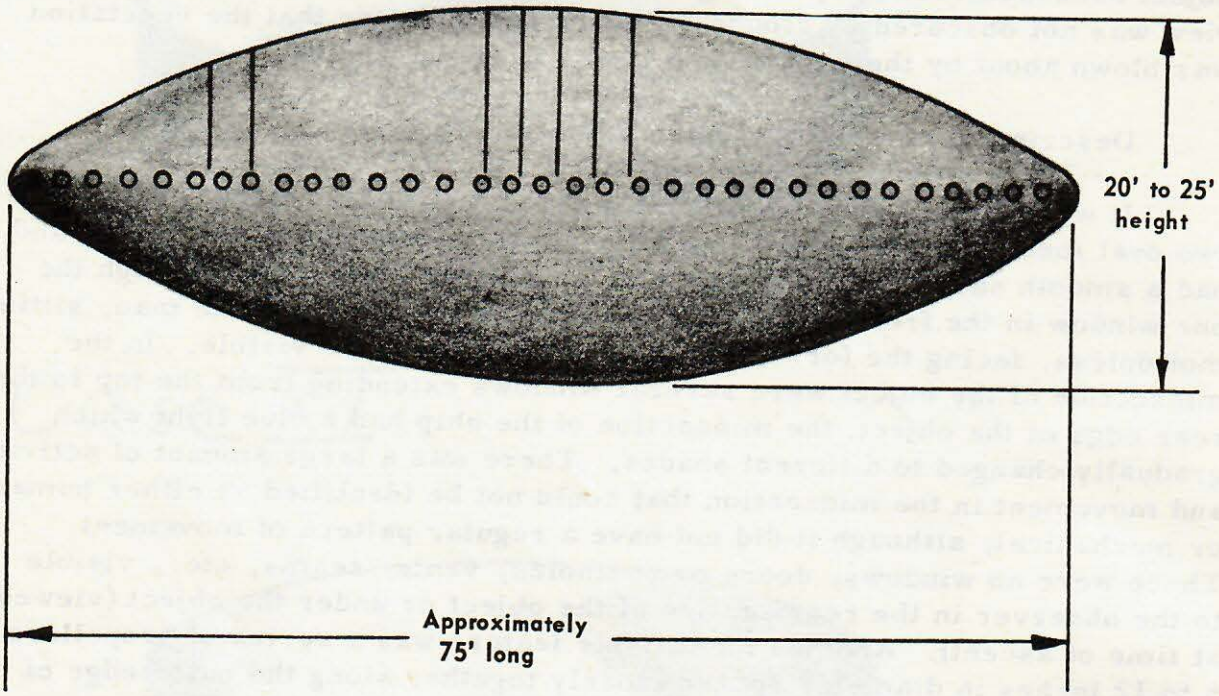

Case XII

These 12 sightings can be classed into four categories on the basis of their shapes, as follows:

(1) Propeller shape – Case I

(2) Aircraft shape – Cases II and III

(3) Cigar shape – Cases IV and V

(4) Elliptical or disc shape – Cases VI to XII

The criterion for choosing the above sightings was that their descriptions were given in enough detail to permit diagrams of the objects to be drawn. It might be noted here that in all but one of these cases (Case XI) the observer had already drawn a diagram of what he had seen.

The objective of this section of the study was the conceiving of a model, or models. The requirement that the description be detailed is an important one, and was the easiest to determine in the re-evaluation program. However, a good model ought to satisfy the following conditions as well:

(1) The general shape of the object and the maneuvers it performed should fit the reports of many of the UNKNOWNS and thus explain them.

(2) The observer and the report should be reliable.

(3) The report should contain elements which should have been observed with accuracy, and which eliminate the possibility that the sighting could be ascribed to a familiar object or to a known natural phenomenon.

(4) The model should be derived from two or more good UNKNOWNS between which there is no essential conflict.

It can be shown that it is not possible to deduce a model from the 12 cases that will satisfy all of these conditions. The following case-by-case discussion of the 12 good UNKNOWNS will illustrate this point:

(1) Case I does not satisfy Conditions 1 and 4. The reported shape of this object is not duplicated in any of the other UNKNOWNS.

(2) Case II does not satisfy Conditions 1 and 3. There are very few UNKNOWNS in the aircraft shape classification. In addition, the unusual characteristic of this sighting (i.e., the red glow) could have been reflection of the lights of Flint from the objects if they were either birds or aircraft.

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(3) Case III does not satisfy Condition 1. It also does not satisfy Condition 4 when Case II is eliminated as a good UNKNOWN.

(4) Case IV does not satisfy Conditions 1 or 2. There are few cigar-shaped or rocket-shaped objects reported in the literature. In addition, this observer is not considered to be well-qualified technically.

(5) Case V does not satisfy Condition 1. It also does not satisfy Condition 4 when Case IV is eliminated as a good UNKNOWN.

It might be argued here that many of the UNKNOWNS might actually have shapes similar to these good UNKNOWNS. It will be noted, however, that each of these five cases does not satisfy one of the other three conditions.

(6) Case VI does not satisfy Condition 2. In the description of the object, it was stated that at certain times there was no light seen from the object. Apparently, the "band of no light", as diagrammed by the observer, was an attempt to explain this. However, if the object were constructed as shown in the diagram, light should have been seen at all times. Because of this conflict the drawing is not considered reliable, and without the drawing, there is not enough detail in the description to make it useful for this study.

(7) Case VII violates Conditions 1 and 4. Although the shape is disc-like, the maneuvers performed by the object are unique both among the UNKNOWNS and among the good UNKNOWNS.

Cases VIII to XII satisfy Conditions 1 through 3, but they do not satisfy Condition 4. The features which make them different from each other are as follows:

(8) Case VIII. The object is smooth, with no protrusions or other details.

(9) Case IX. The object had rocket or jet pods on each side that were shooting out flames.

(10) Case X. The object had a fin or rudder.

(11) Case XI. The object had a series of portholes, or windows, on its under side.

(12) Case XII. The object had windows in its top and front and its top midsection. It also had a set of propellers around its waist.

It is not possible, therefore, to derive a verified model of a "flying saucer" from the data that have been gathered to date. This point is important enough to emphasize. Out of about 4,000 people who said they saw a "flying saucer", sufficiently detailed descriptions were given in only 12 cases. Having culled the cream of the crop, it is still impossible to develop a picture of what a "flying saucer" is.

In addition to this study of the good UNKNOWNS, an attempt was made to find groups of UNKNOWNS for which the observed characteristics were the same. No such groups were found.

On the basis of this evidence, therefore, there is a low probability that any of the UNKNOWNS represent observations of a class of "flying saucers". It may be that some reports represent observations of not one but several classes of objects that might have been "flying saucers"; however, the lack of evidence to confirm even one class would seem to make this possibility remote. It is pointed out that some of the cases of KNOWNS, before identification, appeared fully as bizarre as any of the 12 cases of good UNKNOWNS, and, in fact, would have been placed in the class of good UNKNOWNS had it not been possible to establish their identity.

This is, of course, contrary to the bulk of the publicity that has been given to this problem. The reason for the nature of this publicity was clearly brought out during the re-evaluation study. It is a definite fact that upon reading a few reports, the reader becomes convinced that "flying saucers" are real and are some form of sinister contrivance. This reaction is independent of the training of the reader or of his attitude toward the problem prior to the initial contact. It is unfortunate that practically all of the articles, books, and news stories dealing with the phenomenon of the "flying saucer" were written by men who were in this category, that is, men who had read only a few selected reports. This is accentuated by the fact that, as a rule, only the more lurid-sounding reports are cited in these publications. Were it not for this common psychological tendency to be captivated by the mysterious, it is possible that no problem of this nature would exist.

The reaction, mentioned above, that after reading a few reports, the reader is convinced that "flying saucers" are real and are some form of sinister contrivance, is very misleading. As more and more of the reports are read, the feeling that "saucers" are real fades, and is replaced by a feeling of skepticism regarding their existence. The reader eventually reaches a point of saturation, after which the reports contain no new information at all and are no longer of any interest. This feeling of surfeit was universal among the personnel who worked on this project, and continually necessitated a conscious effort on their part to remain objective.

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CONCLUSIONS

It can never be absolutely proven that "flying saucers" do not exist. This would be true if the data obtained were to include complete scientific measurements of the attributes of each sighting, as well as complete and detailed descriptions of the objects sighted. It might be possible to demonstrate the existence of "flying saucers" with data of this type, IF they were to exist.

Although the reports considered in this study usually did not contain scientific measurements of the attributes of each sighting, it was possible to establish certain valid conclusions by the application of statistical methods in the treatment of the data. Scientifically evaluated and arranged, the data as a whole did not show any marked patterns or trends. The inaccuracies inherent in this type of data, in addition to the incompleteness of a large proportion of the reports, may have obscured any patterns or trends that otherwise would have been evident. This absence of indicative relationships necessitated an exhaustive study of selected facets of the data in order to draw any valid conclusions.

A critical examination of the distributions of the important characteristics of sightings, plus an intensive study of the sightings evaluated as UNKNOWN, led to the conclusion that a combination of factors, principally the reported maneuvers of the objects and the unavailability of supplemental data such as aircraft flight plans or balloon-launching records, resulted in the failure to identify as KNOWNS most of the reports of objects classified as UNKNOWNS.

An intensive study, aimed at finding a verified example of a "flying saucer" or at deriving a verified model or models of "flying saucers" (as defined on Page 1), led to the conclusion that neither goal could be attained using the present data.

It is emphasized that there was a complete lack of any valid evidence consisting of physical matter in any case of a reported unidentified aerial object.

Thus, the probability that any of the UNKNOWNS considered in this study are "flying saucers" is concluded to be extremely small, since the most complete and reliable reports from the present data, when isolated and studied, conclusively failed to reveal even a rough model, and since the data as a whole failed to reveal any marked patterns or trends.

Therefore, on the basis of this evaluation of the information, it is considered to be highly improbable that any of the reports of unidentified aerial objects examined in this study represent observations of technological developments outside the range of present-day scientific knowledge.

APPENDIX A

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	ALL YEARS						1947						1948						1949					
	Number			Per Cent			Number			Per Cent			Number			Per Cent			Number			Per Cent		
Evaluation	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total
0-Balloon	270	180	450	8.4	5.6	14.0	7	0	7	6.0	0.0	6.0	17	20	37	8.3	9.8	18.1	16	5	21	4.1	1.2	5.3
1-Astronomical	476	341	817	14.9	10.6	25.5	32	8	40	27.4	6.8	34.2	36	32	68	17.5	19.0	36.5	74	132	206	18.7	33.5	52.2
2-Aircraft	354	288	642	11.1	9.0	20.1	2	2	4	1.7	1.7	3.4	16	5	21	7.8	2.4	10.2	31	26	57	7.8	6.6	14.4
3-Light Phenom.	32	24	56	1.0	0.8	1.8	2	0	2	1.7	0.0	1.7	2	6	8	1.0	2.9	3.9	0	0	0	0.0	0.0	0.0
4-Birds	19	10	29	0.6	0.3	0.9	0	0	0	0.0	0.0	0.0	2	3	5	1.0	1.5	2.5	4	1	5	1.1	0.2	1.3
5-Clouds, Dust, etc.	12	13	25	0.4	0.4	7.8	0	0	0	0.0	0.0	0.0	0	0	0	0.0	0.0	0.0	0	0	0	0.0	0.0	0.0
6-Insuffic. Info.	298	0	298	9.3	0.0	9.3	14	0	14	12.0	0.0	12.0	19	0	19	9.3	0.0	9.3	36	0	36	9.1	0.0	9.1
7-Psychological	38	10	48	1.2	0.3	1.5	3	2	5	2.6	1.7	4.3	1	0	1	0.5	0.0	0.5	3	0	3	0.7	0.0	0.7
8-Unknown	689	0	689	21.5	0.0	21.5	28	0	28	23.9	0.0	23.9	27	0	27	13.2	0.0	13.2	56	0	56	14.2	0.0	14.2
9-Other	112	35	147	3.5	1.1	4.6	17	0	17	14.5	0.0	14.5	4	8	12	1.0	3.9	5.5	11	0	11	2.8	0.0	2.8
Total	2300	901	3201	71.9	28.1	100.	105	12	117	89.8	10.2	100.	124	81	205	60.5	39.5	100.	231	164	395	58.5	41.5	100.

	1950						1951						1952											
	Number			Per Cent			Number			Per Cent			Number			Per Cent			Number			Per Cent		
Evaluation	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total
0-Balloon	33	7	40	10.8	2.3	13.1	10	4	14	6.2	2.5	8.7	187	144	331	9.3	7.1	16.4						
1-Astronomical	49	25	74	16.0	8.2	24.2	25	17	42	15.6	10.6	26.2	260	120	380	12.9	6.0	18.9						
2-Aircraft	39	15	54	12.7	4.9	17.6	16	8	24	10.0	5.0	15.0	250	232	482	12.4	11.5	23.9						
3-Light Phenom.	0	0	0	0.0	0.0	0.0	2	1	3	1.3	0.7	2.0	26	17	43	1.3	0.8	2.1						
4-Birds	0	0	0	0.0	0.0	0.0	0	1	1	0.0	0.7	0.7	13	5	18	0.6	0.2	0.8						
5-Clouds, Dust, etc.	0	0	0	0.0	0.0	0.0	0	0	0	0.0	0.0	0.0	12	13	25	0.6	0.6	1.2						
6-Insuffic. Info.	49	0	49	16.0	0.0	16.0	14	0	14	8.7	0.0	8.7	166	0	166	8.2	0.0	8.2						
7-Psychological	4	0	4	1.3	0.0	1.3	1	1	2	0.7	0.7	1.4	26	7	33	1.3	0.3	1.6						
8-Unknown	71	0	71	23.2	0.0	23.2	52	0	52	32.5	0.0	32.5	455	0	455	22.6	0.0	22.6						
9-Other	7	7	14	2.3	2.3	4.6	8	0	8	5.0	0.0	5.0	65	20	85	3.2	1.0	4.2						
Total	252	54	303	82.3	17.7	100.	128	32	160	80.0	20.0	100.	1460	558	2018	72.4	27.6	100						

TABLE A2 EVALUATION OF UNIT SIGHTINGS BY YEARS

	ALL YEARS						1947						1948						1949					
	Number			Per Cent			Number			Per Cent			Number			Per Cent			Number			Per Cent		
Evaluation	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total
0-Balloon	228	151	379	8.9	5.9	14.8	7	0	7	7.2	0.0	7.2	14	10	24	9.2	6.5	15.7	11	3	14	4.7	1.3	6.0
1-Astronomical	383	256	639	15.0	10.0	25.0	19	8	27	19.6	8.2	27.8	28	27	55	18.3	17.6	35.9	34	80	114	14.4	33.8	48.2
2-Aircraft	292	235	527	11.4	9.2	20.6	2	2	4	2.1	2.1	4.2	15	4	19	9.8	2.6	12.4	18	12	30	7.6	5.1	12.7
3-Light Phenom.	32	21	53	1.3	0.8	2.1	2	0	2	2.1	0.0	2.1	2	3	5	1.3	2.0	3.3	0	0	0	0.0	0.0	0.0
4-Birds	13	10	23	0.5	0.4	0.9	0	0	0	0.0	0.0	0.0	2	3	5	1.3	2.0	3.3	2	1	3	0.8	0.4	1.2
5-Clouds, Dust, etc.	3	7	10	0.1	0.3	0.4	0	0	0	0.0	0.0	0.0	0	0	0	0.0	0.0	0.0	0	0	0	0.0	0.0	0.0
6-Insuffic. Info.	261	0	261	10.2	0.0	10.2	12	0	12	12.4	0.0	12.4	17	0	17	11.1	0.0	11.1	33	0	33	14.0	0.0	14.0
7-Psychological	36	9	45	1.4	0.4	1.8	3	2	5	3.1	2.1	5.2	1	0	1	0.7	0.0	0.7	3	0	3	1.3	0.0	1.3
8-Unknown	497	0	497	19.5	0.0	19.5	24	0	24	24.7	0.0	24.7	16	0	16	10.5	0.0	10.5	33	0	33	14.0	0.0	14.0
9-Other	92	28	120	3.6	1.1	4.7	16	0	16	16.5	0.0	16.5	9	7	11	2.6	4.6	7.2	6	0	6	2.5	0.0	2.5
Total	1837	717	2554	71.9	28.1	100.	85	12	97	87.6	12.4	100.	99	54	153	64.7	35.3	100.	140	96	236	59.4	40.6	100.

	1950						1951						1952											
	Number			Per Cent			Number			Per Cent			Number			Per Cent			Number			Per Cent		
Evaluation	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total
0-Balloon	22	5	27	10.5	2.4	12.9	9	3	12	6.6	2.2	8.8	165	130	295	9.6	7.5	17.1						
1-Astronomical	42	18	60	20.1	8.6	28.7	21	14	35	15.3	10.2	25.5	239	109	348	13.9	6.3	20.2						
2-Aircraft	30	11	41	14.3	5.3	19.6	16	8	24	11.7	5.8	17.5	211	198	409	12.3	11.5	23.8						
3-Light Phenom.	0	0	0	0.0	0.0	0.0	2	1	3	1.5	0.7	2.2	26	17	43	1.5	1.0	2.5						
4-Birds	0	0	0	0.0	0.0	0.0	0	1	1	0.0	0.7	0.7	9	5	14	0.5	0.3	0.8						
5-Clouds, Dust, etc.	0	0	0	0.0	0.0	0.0	0	0	0	0.0	0.0	0.0	3	7	10	0.2	0.4	0.6						
6-Insuffic. Info.	26	0	26	12.4	0.0	12.4	14	0	14	10.2	0.0	10.2	159	0	159	9.2	0.0	9.2						
7-Psychological	2	0	2	1.0	0.0	1.0	1	1	2	0.7	0.7	1.4	26	6	32	1.5	0.3	1.8						
8-Unknown	42	0	42	20.1	0.0	20.1	38	0	38	27.7	0.0	27.7	344	0	344	20.0	0.0	20.0						
9-Other	6	5	11	2.9	2.4	5.3	8	0	8	5.8	0.0	5.8	52	16	68	3.0	0.9	3.9						
Total	170	39	209	81.4	18.6	100.	109	28	137	79.6	20.4	100.	1234	488	1722	71.7	28.3	100.						

TABLE A3 EVALUATION OF OBJECT SIGHTINGS BY YEARS

	ALL YEARS						1947						1948						1949					
	Number			Per Cent			Number			Per Cent			Number			Per Cent			Number			Per Cent		
Evaluation	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total
0-Balloon	207	132	339	9.4	6.0	15.4	7	0	7	8.9	0.0	8.9	12	10	22	8.4	7.0	15.4	11	2	13	5.9	1.1	7.0
1-Astronomical	274	205	479	12.5	9.3	21.8	8	8	16	10.1	10.1	20.2	25	23	48	17.5	16.1	33.6	29	55	84	15.6	29.5	45.1
2-Aircraft	265	209	474	12.0	9.5	21.5	2	2	4	2.5	2.5	5.0	15	4	19	10.5	2.8	13.3	18	12	30	9.7	6.4	16.1
3-Light Phenom.	30	18	48	1.4	0.8	2.2	2	0	2	2.5	0.0	2.5	2	3	5	1.4	2.1	3.5	0	0	0	0.0	0.0	0.0
4-Birds	12	10	22	0.5	0.5	1.0	0	0	0	0.0	0.0	0.0	2	3	5	1.4	2.1	3.5	2	1	3	1.1	0.5	1.6
5-Clouds, Dust, etc.	3	7	10	0.1	0.3	0.4	0	0	0	0.0	0.0	0.0	0	0	0	0.0	0.0	0.0	0	0	0	0.0	0.0	0.0
6-Insuffic. Info.	240	0	240	10.9	0.0	10.9	12	0	12	15.2	0.0	15.2	17	0	17	11.9	0.0	11.9	25	0	25	13.9	0.0	13.9
7-Psychological	35	9	44	1.6	0.4	2.0	3	2	5	3.8	2.5	6.3	1	0	1	0.7	0.0	0.7	3	0	3	1.6	0.0	1.6
8-Unknown	434	0	434	19.7	0.0	19.7	22	0	22	27.8	0.0	27.8	15	0	15	10.5	0.0	10.5	22	0	22	11.8	0.0	11.8
9-Other	85	24	109	3.9	1.1	5.0	11	0	11	13.9	0.0	13.9	4	7	11	2.8	4.9	7.7	6	0	6	3.2	0.0	3.2
Total	1585	614	2199	72.1	27.9	100.	67	12	79	84.8	15.2	100.	93	50	143	65.0	35.0	100.	116	70	186	62.4	37.6	100.

	1950						1951						1952											
	Number			Per Cent			Number			Per Cent			Number			Per Cent			Number			Per Cent		
Evaluation	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Total	Certain	Doubtful	Tot.l
0-Balloon	21	4	25	12.4	2.4	14.8	8	3	11	6.6	2.5	9.1	148	113	261	9.9	7.5	17.4						
1-Astronomical	25	14	39	14.8	8.3	23.1	16	14	30	13.2	11.6	24.8	171	91	262	11.4	6.1	17.5						
2-Aircraft	22	9	31	13.0	5.3	18.3	15	6	21	12.4	5.0	17.4	193	176	369	12.9	11.7	24.6						
3-Light Phenom.	0	0	0	0.0	0.0	0.0	1	1	2	0.8	0.8	1.6	25	14	39	1.7	0.9	2.6						
4-Birds	0	0	0	0.0	0.0	0.0	0	1	1	0.0	0.8	0.8	8	5	13	0.5	0.3	0.8						
5-Clouds, Dust, etc.	0	0	0	0.0	0.0	0.0	0	0	0	0.0	0.0	0.0	3	7	10	0.2	0.5	0.7						
6-Insuffic. Info.	24	0	24	14.2	0.0	14.2	14	0	14	11.6	0.0	11.6	148	0	148	9.9	0.0	9.9						
7-Psychological	2	0	2	1.2	0.0	1.2	1	1	2	0.8	0.8	1.6	25	6	31	1.7	0.4	2.1						
8-Unknown	39	0	39	23.0	0.0	23.0	33	0	33	27.3	0.0	27.3	303	0	303	20.2	0.0	20.2						
9-Other	6	3	9	3.5	1.8	5.3	7	0	7	5.8	0.0	5.8	51	14	65	3.4	0.9	4.3						
Total	139	30	169	82.3	17.7	100.	95	26	121	78.5	21.5	100.	1075	426	1501	71.6	28.4	100.						

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CODE 67 RANK EQUIVALENT

X	Officer	X	
Y		Y	
0	Lt. 2nd	0	Private
1	Lt. 1st	1	Private, 1st Cls.
2	Capt.	2	Corp.
3	Maj.	3	Serg.
4	Lt. Col.	4	S. T. Serg.
5	Col.	5	M. Serg.
6	Brig. Gen.	6	Warrant Off.
7	Maj. Gen.	7	Chief Warrant
8	Lt. Gen.	8	
9	General	9	

CODE 76 EVALUATION OF OBSERVER RELIABILITY

X	
Y	
0	Complete
1	Quite
2	Fair
3	Doubtful
4	Poor
5	Not
6	
7	
8	
9	Can't be judged

CODE 77 EVALUATION OF REPORT RELIABILITY

X	
Y	
0	Complete
1	Quite
2	Fair
3	Doubtful
4	Poor
5	Not
6	
7	
8	
9	Can't be judged

CODE 78 PRELIMINARY IDENTIFICATION

X	Possibly
Y	
0	Balloon
1	Astronomical
2	Aircraft
3	Light phenomenon
4	Birds
5	Clouds, dust, etc.
6	Rocket or missile
7	Psychological manifestations
8	Electromagnetic phenomenon
9	Other

CODE 79-80 FINAL IDENTIFICATION

X	Probably
Y	
0	Balloon
1	Astronomical
2	Aircraft
3	Light Phenomenon
4	Birds
5	Clouds, dust, etc.
6	~~Rocket-or-missile~~ Insufficient information
7	Psychological manifestations
8	~~Electromagnetic-phenomenon~~ Unknown
9	Other

CODE 67 ANGULAR ACCELERATION
(Change in angular velocity)

X	Variable
Y	
0	Zero, V = constant
1	Increasing slowly
2	Decreasing slowly
3	Increasing fast
4	Decreasing fast
5	Increasing very fast
6	Decreasing very fast
7	
8	
9	

CODE 68 APPEARANCE BEARING

X	
Y	
0	N
1	NE
2	E
3	SE
4	S
5	SW
6	W
7	NW
8	
9	

CODE 69 DISAPPEARANCE BEARING

X	Disappeared suddenly
Y	
0	N
1	NE
2	E
3	SE
4	S
5	SW
6	W
7	NW
8	
9	

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New York 17, New York

CODE 70-71 ELEVATION
WITH RESPECT TO GROUND, DEGREES

	Initial		Final
X	Variable	X	Variable
Y		Y	
0	0-9	0	0-9
1	10-19	1	10-19
2	20-29	2	20-29
3	30-39	3	30-39
4	40-49	4	40-49
5	50-59	5	50-59
6	60-69	6	60-69
7	70-79	7	70-79
8	80-89	8	80-89
9		9	

CODE 72 OBJECT ORIENTATION
Apparent inclination of principal axis of object from horizontal

X	Variable
Y	
0	+90° to 60°
1	+60° to 30°
2	+30° to 10°
3	+10° to 0°
4	0°
5	0° to -10°
6	-10° to -30°
7	-30° to -60°
8	-60° to -90°
9	

CODE 73 MANEUVERS

X	
Y	
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	

CODE 74 OBSERVER OCCUPATION

X	
Y	Civilian, occupation not stated
0	Army, military
1	Navy, military
2	Marine, military
3	Air force, military
4	Coast guard, military
5	Merchant marine, military
6	Commercial air, civilian
7	CAA, civilian
8	Government contractor, civilian
9	Civilian, other

CODE 75 EVALUATION OF OBSERVER RELIABILITY

X
Y
0 Complete
1 Quite
2 Fair
3 Doubtful
4 Poor
5 Not
6
7
8
9 Cannot be judged

Dwight D. Eisenhower Library

CODE 76 EVALUATION OF REPORT RELIABILITY

X
Y
0 Complete
1 Quite
2 Fair
3 Doubtful
4 Poor
5 Not
6
7
8
9 Cannot be judged

CODE 77 RELIABILITY GROUP CLASSIFICATION
(Based on observer and report ratings)

Excellent (Observer 0 or 1 and Report 0 or 1)
Good (Observer 0 or 1, Report 2, 3, or 4; Observer 2, 3, or 4, Report 0 or 1; Observer 2, Report 2)
Doubtful (Observer 0 or 1, Report 5 or 9; Observer 2, Report 3, 4, 5, or 9; Observer 3 or 4, Report 2, 3, 4, 5, or 9; Observer 5 or 9, Report 0, 1, 2, 3, or 4)
Poor (Observer 5, 9, or Y, Report 5, 9, or Y)

CODE 78 FINAL IDENTIFICATION

X Probably
Y
0 Balloon
1 Astronomical
2 Aircraft
3 Light phenomenon
4 Birds
5 Clouds, dust, etc.
6 Insufficient information
7 Psychological manifestations
8 Unknown
9 Other

GF 145-F(1) Box 1155