

188-5

AIR MATERIEL COMMAND
WATSON LABORATORIES
Red Bank, New Jersey

ACT/mm

WLEAT

SUBJECT: Research Operations in Alaska

TO: Commanding General
Air Materiel Command
Wright Field
Dayton 2, Ohio
ATTN: TSELT

1. Plans for research on Project "Mogul," E. O. 188-11, priority 1A, include determination of compressional wave velocity in the upper atmosphere in regions of high latitude. This information is vital to the completion of the project and as far as is known, no previous work has been done in this field. These Laboratories are now planning to begin the first phase of this research in Alaska between 15 October and 15 December 1947. Completion of this first phase will require about six weeks at the test site.

2. The method of determining acoustic velocity fields in the upper atmosphere will be similar to that which has been done off the New Jersey coast and in New Mexico throughout this year. Explosives are set off at or near the earth's surface and the resulting compressional waves refracted through the upper atmosphere are recorded at sites up to 300 miles distant. One method consists of cropping airburst bombs from airplanes flying a course in various directions from the recording sites, 50 to 300 miles away. Another method involves firing charges of explosives on the ground at fixed distances from the recording sites. Whichever method is used will depend upon available conditions and the granting of clearances to do the work. Both methods have been successfully used for over a year. Techniques are well established and the engineering personnel are well experienced on all phases of the operations.

3. A previous survey of facilities in Alaska by personnel of these Laboratories indicates that all requirements may be fulfilled at Ladd Field, Fairbanks. The following requirements are necessary to conduct either or both types of tests:

a. Facilities for landing and servicing a C-54 airplane and either a B-17 or a B-29 airplane.

b. Housing and messing facilities for three civilian technicians from the Watson Laboratories and the military aircraft crews for a period of six weeks.

U-37827


Basic ltr WLAMC, 9 Sep 47, to CG AMC, subj: "Research Oprs in Alaska."

1st Ind TSELT(TSELO)/JGR/1a

Hq AMC, Wright Field, Dayton, Ohio. 10 Sept 47

To: Commanding General, Army Air Forces, Washington 25, D. C.
ATTN: AC/AS-4

1. The proposed operation outlined in the basic correspondence is concurred in by this command.

2. In view of the high priority carried by this project, request that necessary action be taken to have the Alaskan Department provide the necessary facilities.

FOR THE COMMANDING GENERAL:

/s/ Tom C. Rives

TOM C. RIVES, Brig Gen, USA
Chief, Electronic Subdivision
Engineering Division

C
O
P
Y

Ltr Watson Labs. 14 Jun 46, subj: "Change in Class. of 'Mogul,' Item 188-5."

1st Ind.

TSELT-2/WHd/mch

Hq., Air Materiel Command, Wright Field, Dayton, Ohio. 8 July 1946.

TO: Commanding General, Army Air Forces, Washington 25, D.C.

THRU: (AC/AS-4)

1. To amplify the information given in the basic letter it is desired by Electronic Subdivision that the following information and scientific data pertaining to project "Mogul" be classified "TOP SECRET:"

a. Precise data as to the exact placement of measuring instruments.

b. Scientific observations and measurements that have military application.

c. Detailed methods of measuring results.

2. Engineering preparations for the final test that are not in conflict with the above will be classified "Confidential."

3. Contractual documents will be classified the same as the security classification of the equipments involved. Equipments used in project "Mogul" are common to other systems or sets that are now classified "Confidential," "Restricted," or "Unclassified;" contractual documents should be classified accordingly.

4. Authorization is requested to observe the security classifications proposed herein.

FOR THE COMMANDING GENERAL:

E. O'DONNELL
Brig.Gen., U.S.A.
Deputy Chief
Engineering Division

Signed Sworn Statement
of Spilhaus
June 3, 1994

STATEMENT OF WITNESS

Date: 3 Jun 94

Place: ~~XXXXXXXXXX~~ VA

CSF I Athelstan F Spilhaus, hereby state that Jeffrey Butler, was identified as a Colonel, USAF and Jim McAndrew, was identified as a Lieutenant, USAF on this date at my home and do hereby, voluntarily and of my own free will, make the following statement. This is done without having been subjected to any coercion, unlawful influence or unlawful inducement. *CSF*

CSF I was the Director of the NYU Balloon Project and also involved with many other sensitive activities. Until these discussions, I had no indication of what the "Roswell incident" was. I was involved in numerous unusual activities such as reconstruction of captured German rockets, development of drone planes and the like--such as long range balloons. The Army Air Force had seen what the Japanese had done with long range balloons; although not effective as weapons, they did initiate the long-range balloon research which led to use of balloons for the detection and collection of debris from atomic explosion. Although I was involved in sensitive classified programs, I completed secrecy agreements for various projects, and I understand that this activity (Mogul, etc. is now declassified) and I did enforce "need to know". In part, I left NYU because the administration wanted to know too much about the various projects I was involved in (the Bikini test). At one time I was sent by the US government to assist the South Africa meteorological efforts and I worked numerous other special missions. Even though the war was over the Cold War had just started and certain things were sensitive. I recall that it was Col Duffy who brought me from the Reserves to active duty. It was during this period that I did become involved in a "UFO case". Some bush pilot had found some pock marks in dry snow in Alaska in 1950. So we flew up and saw peculiar round holes in the snow. We landed and took dog sleds to the site and found craters with a hole in the center. We cored one out of the snow and found a center of frozen conical ice. I began to think of something I had seen in the desert where glass had been formed similarly after a lightening strike (the "fumoroles"). I took one back to the university in dry ice and wrote a classified report. We even simulated a small lightning strike over dry snow (just from the snow blowing over the surface) and came up with conical ice formations. This was the Stony River Incident and it wasn't a UFO. On the December 1947 balloon project reports the "service flights" probably refer to the then Top Security project AFOAT 1 (related to MOGUL) which was to produce a report to the President when the Russians exploded an atomic device and were ready to produce a droppable atomic bomb. We coordinated all the listening posts to determine what stage the Russians were at. Concerning the Watson Laboratory gear, I don't remember the specifics of what that gear was. I recommend you check with Charlie Moore for those details. Many of the projects I just new about in general--these were sensitive times--it was sometimes better not to know too much--I knew about the collection of debris with special planes daily from Eilson AFB to the North Pole and back, PTARMIGAN flights, that lasted through the 50's. Concerning the Japanese balloons, I don't recall any specifics. Nor do I recall whether we had REWARD tags on all the balloons. I went many times to Alomogordo AAF and White Sands--not necessarily for balloon flights. I worked on naval activity such as the thermal affects on SONAR. Concerning actual balloon construction, Winzen of St Paul Minnesota, in association with General Mills, did most of the balloons. General Mills also did some balloon projects. Winzen made the first polyethelene (non-stretchable balloons). Flight #5, I really did not get into the details of the individual flights or experiments. The polyethelene material was very durable--it was designed not to burst--you could push a sharp thing through it but it would be difficult to tear *CSF*

Athelstan Spilhaus

it with your hands. There was also debris collection on sticky paper. Most of the balloon projects were not concerned with weather--that's why there weren't radiosondes on all the balloons. The "cosmic ray train" was probably just a cosmic ray experiment on one of our balloons. The balloons were made of sections and had tape reinforcements but I don't recall any specifics on the tape material. Mylar was not called that originally--it may have originated as polyethelene. All the polyethelene we use was of a translucent material. Neoprene was used during the war; generally for meterological and artillery firing balloons. The artillery radar tracked the balloons with corner reflectors--this gave the winds aloft to assist the gunners. The radar reflectors were sheets of reflective material and they changed over time but I don't recall the details of the changes. On reviewing Charlie Moore's letter, the acoustic detection relates with the atomic debris collection. The reflectors were for tracking and was made up of a metalized paper or fabric. Charlie explains the flowers--I'd heard about the flowers before, don't remember where--we used whatever we had in the experimental realm. The targets were throw-aways--we didn't put a tag on them, maybe a radiosonde, but not a target. Such a train would make gouges (shallow) as it was dragging the ground. We used meterology as a cover story--it was a natural. It had a purpose beyond the project--we could use the constant level analysis of the constant pressure (isobaric) vs constant altitude to study atmospheric mathematics--therefore using it was natural. Ramey's press conference--the Air Force position makes sense for the mistake that the PIO made in his statements. (All the NYU personnel had left Alamogordo when the "material" was brought in--someone stated that it may have been Col Duffy's and therefore sent it to him at Wright Patterson--not because it was extraterrestrial) It is a logical reason to send it (the debris from the desert) there--not because it was special--Col Duffy was a fine officer and I'm sure he'd recognize it. I was not aware of any association between our balloon projects and the alleged "Roswell incident" until this interview. I am not part of any conspiracy to withhold information from either the US government or American public. There is no classified information that I am withholding related to this inquiry and I have never been threatened by US Government persons concerning not talking about this situation.

SIGNED:



WITNESS(s):



Subscribed and sworn to before me, a person authorized to administer oaths this

3rd day of June 1994 at ~~Wright Patterson~~
VA



JEFFREY C. BUTLER, COL, USAF



JAMES MCANDREW, 1LT, USAF

STATEMENT OF WITNESS

Date: 8 Jun 94

Place: ~~SECRET~~, NM

C.B.M.
I, Charles B Moore, hereby state that Jeffrey Butler, was identified as a Colonel, USAF and Jim McAndrew, was identified as a Lieutenant, USAF on this date at my home and do hereby, voluntarily and of my own free will, make the following statement. This is done without having been subjected to any coercion, unlawful influence or unlawful inducement. *C B M.*

C.B.M.
I was the Project Engineer for the NYU balloon project during the 1947 time frame. I was not aware that the project had the name MOGUL until 1992 when I was contacted by an individual who was working on some research related to the "Roswell Incident" and the relationship to the NYU balloon project. Our only purpose for the NYU group was to develop constant level balloons. In the early flights at Alamogordo, starting in June, 1947, we used radar targets to track the balloons (not all the balloons had targets). Some of the targets were apparently manufactured by a toy or novelty company. Ed Istvan was the procurement officer and he had contacted some company that extruded toothpaste tubes as well as radar chaff. The early balloons were made of neoprene and manufactured primarily by the Dewey Almy company in Cambridge and the Kaysam company. Dewey balloons were dip type and the Kaysam ones were cast in a mold. The neoprene balloons were susceptible to degradation in sunlight turning from a translucent milky white to a dark brown. Some of the material would almost look like dark gray or black flakes or ashes after exposure to the sun for only a few days. The balloon material and radar target material would be scattered after returning to the earth depending on the surface winds. The balloon material also had a peculiar acrid odor due to plasticizers and anti-oxidants. There is a recollection from another procurement person (Peterson) that he had obtained radar reflectors from a toy manufacturer. I have a specific recollection of reinforcing tape applied to the seams of the reflectors that had some symbols such as arcs, flowers, circles and diamonds. These were pinkish in color. To my knowledge, there were no radar reflectors in New Mexico in 1947 like the ones we used until the NYU group arrived. The Columbia group was primarily involved in developing low frequency microphones for long range detection of explosions. There was intense pressure for these developments, the constant altitude balloons and the microphone gear. I was involved in 1945 in China-Burma-India for the installation and maintaining of weather equipment in the war against Japan. Our subsequent work with the balloons and microphones was highly classified and we didn't know that there was a project name until 1992. Concerning the make up of the balloon trains, we used braided or twisted nylon lines--there were no monofilament lines during the 1947 time frame. Some of the balloons in early June carried radar targets for tracking purposes since we did not have radiosonde receivers with us. Some also carried sonobouys for detecting the pressure waves where we didn't have the Watson Lab microphone gear. All the radiosondes were covered in white painted cardboard; I don't recall the color of the sonobouys but I believe they were covered in metal. On review of the photos in the Randle/Schmitt book, the material looks like one of our balloon and target assemblies. The wooden beams were made of a balsa wood that had been coated in an Elmers-like glue. The targets had eyelets where the various strings were attached. The 307(B) model was more of an aluminum foil material than the 307(C) model, which was more of an aluminized paper. The targets we used appeared more fragile than the later

C.B.M.

C.B.M.

I can think of no other explanation for Roswell than one of our early June service flight balloons. If one of our balloons went down there was no shroud of secrecy about it. We would attempt to recover the flight gear when possible, but the reflectors, balloons, and microphone equipment was expendable. We went to no great effort to recover the equipment and we certainly would not cordon off an area where one of our balloons went down. We would sometimes send out 3-4 men to recover the equipment if we knew where it went down. The July 10th Alamogordo News report was a good cover--it does not appear to be a coincidence--I don't know who may have initiated it. Trakowski does not recall being involved in a cover story in one of my conversations with him. In New Mexico during 1947, all of our balloon operations were launched from Alamogordo AAF. C.B.M.

C.B.M.

I am not part of any conspiracy to withhold information from either the US government or American public. There is no classified information that I am withholding related to this inquiry and I have never been threatened by US Government persons concerning refraining from talking about this situation. C.B.M.

SIGNED:

Charles B. Moore

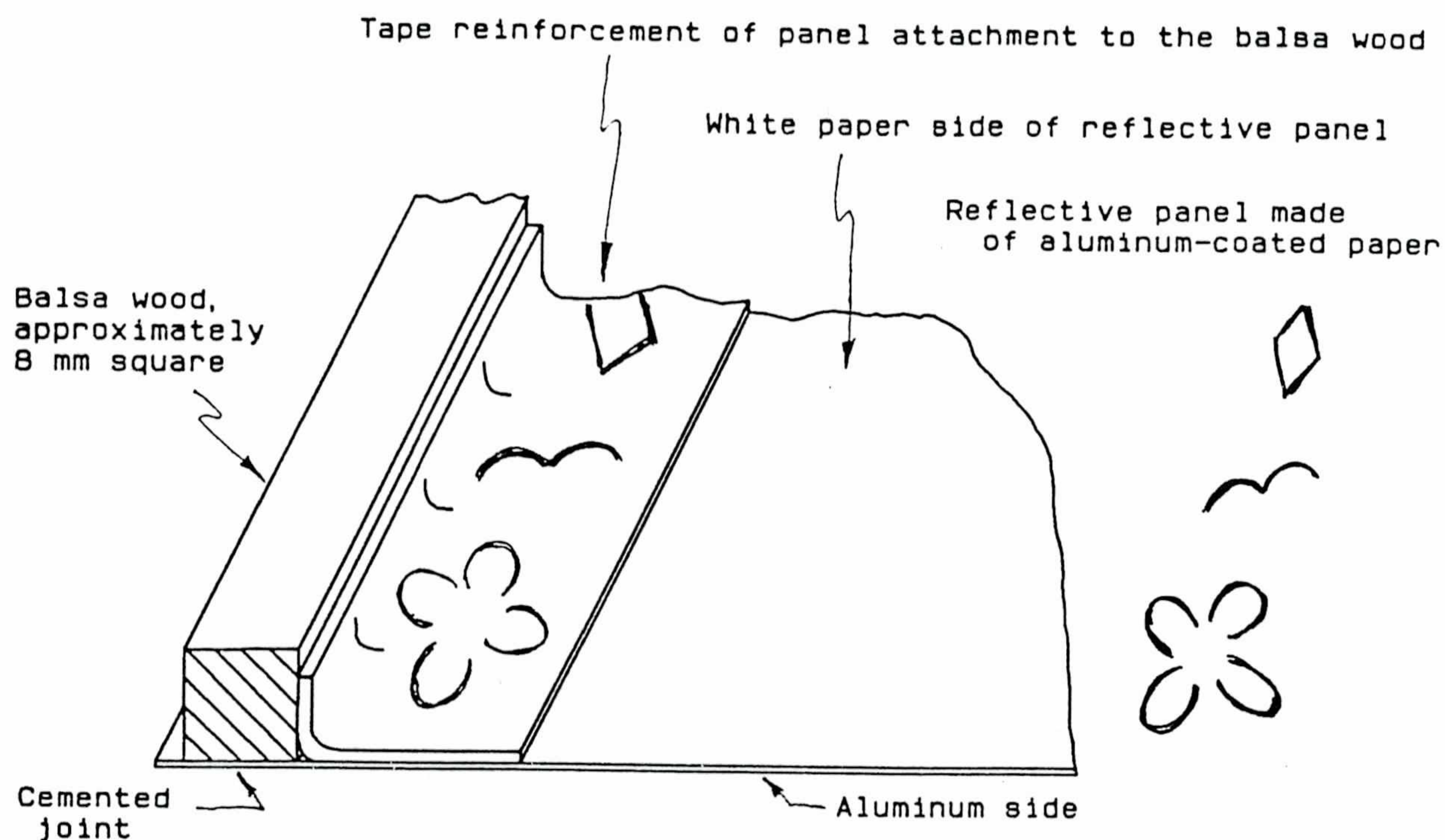
WITNESS(s):

Subscribed and sworn to before me, a person authorized to administer oaths this

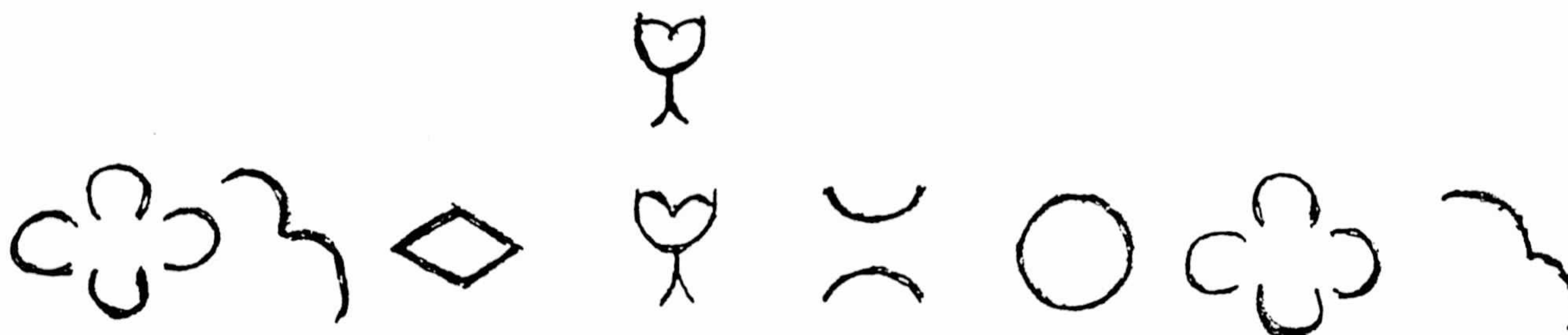
8th day of June 1994 at [REDACTED], NM


JEFFREY C BUTLER, COL, USAF


JAMES MCANDREW, 1LT, USAF



MY RECOLLECTION OF THE REFLECTOR MATERIAL ATTACHMENT TO THE Balsa WOOD PIECES
ON THE ML-307/AP PILOT BALLOON RADAR TARGETS IN 1947.



AN APPROXIMATE REPRODUCTION OF THE FIGURES PRINTED ON THE TARGET-REINFORCING TAPE
(This is not authoritative since I last saw one of these targets more than
20 years ago.)

C. B. Moore

C.B. Moore
August 28, 1992

Three to five sounding balloons,
350 gram size, each inflated
to about 4 feet in diameter

Wind
→

Three ML-307 radar targets
(corner reflectors)

Restraining line
(cut and let go free
at launch.)

Ground level
↓

TYPICAL RADAR TARGET FLIGHT TRAIN USED BY THE NYU BALLOON GROUP IN 1947

Signed Sworn Statement
of Trakowski
June 29, 1994

STATEMENT OF WITNESS

Date: 29 Jun 94

Place: [REDACTED], VA

I, Albert C. Trakowski, hereby state that Jeffrey Butler, was identified as a Colonel, USAF and Jim McAndrew, was identified as a Lieutenant, USAF on this date at my home and do hereby, voluntarily and of my own free will, make the following statement. This is done without having been subjected to any coercion, unlawful influence or unlawful inducement.

I was provided a background on the Air Force efforts related to the GAO audit and its association with the "Roswell Incident" and project Mogul. I personally know all the persons that Col Butler identified to me as having been contacted in this effort (Spilhaus, Moore, Istvan, Fletcher, Ms Duffy). I have also been contacted by several researchers and writers and discussed project Mogul and provided some documents to some of them. Robert Todd, I'm not sure whether he was a believer or not. Charles Ziegler was working on the history of nuclear weapons detection capability. He had some letters/papers that I did not have such as the letters the Gen Spaatz directed the establishment of project Mogul. Carl Pflock apparently wanted to establish the "incident" of Roswell as a UFO incident. Charlie Moore was primarily responsible for development of the constant level balloons for lifting the instrument packages. Concerning a cover story for the project Mogul, there was no planned cover story. I do not recall any documentation nor any efforts to develop a cover story even though the security for Mogul was of great concern. Charlie Moore and Athel Spilhaus used meteorological research as a cover but this was a spur of the moment effort--it was an obvious answer to a query--there was no documentation for using meteorology. We never considered a planned cover story; we were concerned with security.

I was the project officer succeeding Col Duffy in approximately November 1946. My primary purpose was nuclear weapons and guided missiles detection programs. Previously, I was appointed as the laboratory chief in the Signal Corps as an Air Force officer in charge of the Spherics program and later for the development of weather radar. Since my background was in physics, I took over project Mogul. It was the only Top Secret project at Watson Labs and I was the Top Secret Control Officer, so I knew the impacts with security associated with the project. We moved from Watson Labs to Cambridge Me which combined became the Air Force Cambridge Research Center, and I became the Director of the Air Force Geophysics Lab (and remained so until 1949). Through 1949, I was the director of both MX968 and Mogul. As the Mogul director, I went to Alamogordo Army Air Field in early July 1947, to observe the New York University balloon group. The "Roswell Incident" occurred after we had returned to Red Bank (Watson lab) NJ. I became aware of this only after Col Duffy called me from Wright Field from his home. This was just an informational call, he just wanted to let me know that someone had come to him with some debris from New Mexico and he said, "this sure looked like some of the stuff that you launched from Alamogordo." Duffy was very familiar with the various

apparatus and materials for the project, so if he said that it was debris from the project, I'm sure that's what it was. He was not concerned with a breach of security for the project.

Concerning the name Maj Pritchard, he may have worked for me but I don't recall him. I have no knowledge of any counterintelligence, or intelligence persons on the project or associated with my directorate at Watson or Cambridge Labs. When we took over the project, we were aware of the sensitivity of the project--we were aware that we were working in the open--it was a weakness of security because the activity could be observed. I never observed any of the balloon "trains" but I did see some of the early reflectors. Some of the reflectors were procured from sources out of normal channels. Some of the contractors lined up were not quite in concert with typical Signal Corps practices and procedures. Jack Peterson was very energetic and could make procurement actions take place. Ed Itsvan, who I believe actually arranged for production for some of the reflectors, actually went to a toy manufacturer in New York city to get some. It was kind of a standing joke. I remember that some of the prototype and preproduction targets had this pink or purplish tape holding the material to the balsa beam. This tape had flowers and other designs on it. The reflectors were probably made starting in late 1944 but I do not recall how long the production run was. I do not recall any other specific attributes but they were geometrically and structurally simple.

I am not part of any conspiracy to withhold information from either the US government or American public. There is no classified information that I am withholding related to this inquiry and I have never been threatened by US Government persons concerning refraining from talking about this situation.

SIGNED:

Albert C. Trakovich

WITNESS(s):

Subscribed and sworn to before me, a
person authorized to administer oaths

this
28th day of June 1994 at [REDACTED], VA

Jeffrey C. Butler
JEFFREY C. BUTLER, COL, USAF

James M. Andrew
JAMES MCANDREW, 1LT, USAF

Transcript from 8 June 94, Interview with
Professor Charles Moore

(A) Professor Charles Moore
Project Engineer - Project Mogul
(Q) Colonel Jeff Butler
(Q) Lieutenant Jim McAndrew
8 June 1994

A: ...Dr. Spilhaus, who you may have met, was really the Director of the project.

Q: We talked with him last week. He sends you his regards. He's a very interesting man to chat with.

A: But I was essentially the project engineer and a graduate student, whereas he was Director of Research at New York University at that time.

Q: We have gone through many of the various technical documents related to Project Mogul and some of the other work that you and Dr. Spilhaus and others have done with the Constant Altitude balloon projects. According to Dr. Spilhaus, he said you would be the technical expert as it related to those types of projects in terms of the materials involved, the instrumentation, that sort of thing. Is that a pretty accurate statement?

A: I think that's correct.

Q: What we're really here for is to discuss this that came out in the newspaper and the General Accounting Office's investigation of how we deal with records, the acquisition, and ultimately disposition. There is an allegation that the Government is involved in a conspiracy and coverup of something that occurred in 1947, which is the allegation of their being some sort of flying disk, flying saucer, UFO, what have you.

A: That's correct.

Q: Of course the people who put out things such as this journal, MUFON, Mutual UFO Network, the books that have been written by William Moore, and Randall Schmidt, and others, a lot of the popular television shows, they've just exacerbated the situation where a lot of things, quotations, some of your quotations taken out of context. One of the individuals, Sheridan Cavitt, who at that time was a Counter-Intelligence Corps officer at [Roswell] Army Airfield who actually went out with Jesse Marcel to recover some material that has been alleged to be the results of a UFO which Colonel Cavitt specifically states looked like a weather balloon to him.

A: I'm aware that he had been there, but I'd understood that other quotations had been attributed to him.

Q: Yes, sir. As we go through this, I believe I've got a copy of essentially a statement he made to Colonel Weaver, whom

you've talked with also. Colonel Weaver talked with Sheridan Cavitt two weeks ago. So a lot of the statements that have been attributed to Sheridan Cavitt, he says they're taken out of context. He refutes a lot of the information that appears in these various books.

What I'd like to do, even though this is out of a popular UFO type of magazine, is there are some statements attributed to individuals concerning the material that was found, supposedly by Mac Brazel, somewhere northwest of Roswell, New Mexico. They talk in terms of materials that look like metallic foil, and specifically that "could not be bent or broken."

As we've gone through the various research, what we believe to be Project Mogul was probably involved in this incident. The materials that were being used in Mogul included, of course, not only the polyethylene balloons, but included the neoprene balloons at some point, the various types of radar reflectors, the instrumentation that was being used. Is there any type of material from that project that you can think of that would be pliable, would be bendable, but could not be torn? Could any of the polyethylene or the foil-like radar reflectors, could that be the case?

A: Let me get a picture for you. This is a radar reflector manufactured in 1953. It's the ML-307C.

Q: Which is a little different from the B model that was used in 1947?

A: Where this looks like a pine stick, the material on the ones we had, this was all balsa and somewhat smaller in diameter, but the configuration, with one exception... This configuration of corners, these corners were the same thing. Here's a picture of this sort of target being used in 1948, and you can see we are launching multiple targets beneath this balloon.

Q: Is this the same type of target as this, or is this the B model?

A: This is the B model we flew in 1947 and 1948. Those are pictures of the B model. If you look, faintly along here you can see a sort of a discoloration, and that's where my memory of the reinforcing tape was that they talked about. The B models, as I remember, did not have these three vanes up here. You don't see particularly any suggestion in other photographs I have, I don't remember these which would make the thing rotate in flight.

But this, in the B models was more like an aluminum foil with a heavy laminated paper. So the material they talk about, I think, was derived from some version of this.

Q: They talk in terms of the material, being able to crumple it and releasing it, and it would unfold by itself and

not leave any creases. This material looks like it would almost be like aluminum foil, would crease and remain creased.

A: It does have this paper laminate, and the paper, I think, was maybe a bit tougher on the earlier thing. But I have no explanation for the fact that it couldn't be bent with a sledge hammer, as one of the people said, and couldn't be...

Q: Burned?

A: I think some of the balsa wood was dipped in something like Elmer's glue, and as a result had some sort of a glue coating on it which would make it somewhat resistant to burning.

Q: I know in Colonel Weaver's discussions with Sheridan Cavitt, they talked about the aspect of burning. He did not recall burning anything, but then his wife indicated that there had been one night they'd been out and had a barbecue and had a few beers and that Jesse Marcel just took a piece and stuck it in the barbecue and then pulled it back out. So if that's what they're using to say it wouldn't burn, that's what we consider typically testing a material for burning or not.

A: I need to say here, you need to qualify everything I say with the memory of almost 50 years ago. I will say things that are to the best of my memory, but on the other hand, should other evidence indicate my memory is faulty, I readily accept that. So I'll state things to the best of my memory, but...

I have a memory that there was something like Elmer's glue... There was a problem in attaching this to the paper behind.

Q: Going back to the reinforcing tape and things, there were discussions concerning unusual symbols and almost like hieroglyphics -- purple, pinkish in nature, that sort of thing.

A: I don't know if I sent Colonel Weaver a copy of the sketch.

Q: No, we did not see that.

A: Robert Todd, who has been a person very interested in trying to get to the truth of this, asked me to make a sketch of what I remember. A couple of years ago, or a year or so ago, I made this sketch, and this is my memory of what was there.

I do remember every time I prepared one of these targets for flight, I always wondered why these figures were on the tape. There was always a question of why they were there. When this purplish-pink marking on the debris came up, I immediately remembered this sort of marking. Other people, I have a letter here from one of my technicians, who says oddly he remembers the same marking. You, perhaps, have talked to Albert Trakowski...

Q: We have tried to reach Colonel Trakowski, and he has not returned our calls. We've left messages on his answering machine, and there's been no response.

A: He may be out of town. I did visit him last October, and he made the point that... He was our project officer. He and I served together under Colonel Duffy in the Air Force Liaison Office in 1943 to... Well, I went overseas in '44 but Trakowski stayed and took a commission in the Air Force when it was offered and was the project officer on Mogul. I have some paperwork here from General LeMay's files in which after the war a number of people were to be sent overseas because they had not had overseas duty. There is a history of Colonel Trakowski. Perhaps you have it from the Pentagon files already, from the AG files.

Q: We have some records, yes.

A: Anyway, Albert Trakowski was the Watson Laboratory project officer on this. When I raised this question to him he said he had talked to John Peterson, one of Colonel Duffy's procurement men, and they were joking about these markings on the tape. I have a letter that I can give you a copy of in which I quote Trakowski in saying, "What do you expect when you have your targets made by a toy factory in Manhattan?"

Q: So essentially, the original targets were made by a toy company?

A: Well, it's either a toy company or a garment manufacturer in the garment district in Manhattan, or it was by a novelty company. I talked to Ed Istvan who was another one of the Air Force liaison office people who stayed in. Istvan lives in your area. I can give you documentation on these things. Istvan says that it was some outfit that extruded toothpaste tubes and he got involved with them because they made radar chaff. In the early days of this effort, there were a number of different targets made. I don't have them here, I have them downstairs, there were a number of different forms the targets were made. One idea was just the inside of a meteorological balloon, to put radar chaff and adhere it with glycerine. Just wet the inside of the balloon with glycerine and then shake in dipoles cut to the proper half wave length. When the balloons were inflated, these would be all on the inside, coating the inside of the balloon. This didn't give nearly the sort of target that the corner reflector gave.

But anyway, Istvan initially went to New York hunting for a source of supply and came across a company.

(Pause)

A: ...much of which we can copy and make it easier for you. These are balloon fragments, things that held balloons [up] after they'd been exposed to the sun.

Q: Is this the neoprene type or the...

A: That's the neoprene type. I have the polyethylene type...

Q: Is this from the '47 era?

A: That's a balloon probably from the '50s. That's a K-San balloon. The kind of balloons we used then were the (inaudible) derricks balloons, and that's the way they look after they've been out in the sun. That's about three weeks' exposure to sunlight here in New Mexico.

Q: So the polyethylene really is degraded by sunlight.

A: That's neoprene. All that's neoprene.

Q: This almost looks like ashes of paper.

A: That's right. And there's a big point in some of the recovery that the material was black...

Here is the list of the people who were assigned under Colonel Duffy in the Air Force liaison office. Istvan's name you'll find in there. He ended up being in the Titan program and, I think, retired as a lieutenant colonel maybe back in the '70s.

Schneider was the administrative director of our project. He and I worked together. He was in Maine, and was not really technically involved. I have letters from him if you're interested in seeing them. He says he has no memory of this.

A person who was heavily involved in developing this whole radar thing was Colonel Joe Fletcher. I wrote him a letter asking for his help and he essentially says he doesn't remember much.

Q: He's also been hounded by some of these UFO...

A: And by Todd and by me.

Q: So it appears as though you, yourself, have done some extensive research into this particular incident.

A: Until two years ago, I was quite convinced one of our polyethylene balloons we didn't recover caused it. Then I got this newspaper, Todd sent me this, and I immediately saw there's no way that could be a polyethylene balloon.

Q: W.W. Brazel mentions eyelets which appear in the reflectors. There's also, on the polyethylene balloons, the shroud however you had it hooked on there. There's eyelets around the base. There was a ring at the neck of the balloon and then there were attach points to that ring, were there not?

A: But there were no eyelets.

Q: I believe there were. I've reviewed the New York University documents and there's a very clear depiction in one of them of eyelets.

A: Okay, I was thinking of the later... Here are the NYU reports, the originals of them.

Q: In one of the configurations they clearly show eyelets in the drawing.

Q: Going back to Brazel, you state that you think it could not be one of the polyethylene balloons. He indicates in this newspaper article that he actually found the debris in mid-June, however it didn't subsequently come out until July.

A: You're right. That is in one of the polyethylene balloons, you're correct. I fall back on my plea that my memory isn't...

Q: It comes into depending on what Brazel was speaking about.

A: There are clearly eyelets here. In fact there's a little swivel.

He talks about the smoky gray rubber...

Q: Which these samples here, as you say, if they'd only been out for a short time, a matter of days, smoky gray, that's a very good description of what they looked like.

A: And when you first retrieve it has a bad odor. And people talked about there being a burned odor.

We need to talk about these neoprene balloons because they came in different... There were two manufacturers -- one, Dewey & Olney in Cambridge manufactured with a dip process and they had very much the appearance, if you will, of a condom. They were an ivory colored jell. The Kaysam company in Patterson made a cast neoprene emulsion into a mold, and then they inflated the mold. They had to put a lot of plasticizers so they could take this wet jell and inflate it and make it into a meteorologic balloon. This is a Kaysam balloon here, which I think is not a good candidate.

Q: Kaysam?

A: A guy named Sam Kay formed a company and it was called Kaysam. In fact I have, and you're welcome to them...

(Pause)

A: Kaysam balloons because of the way they were made, and this jell that had to be inflated had this ring, cardboard ring put in them. That's the neck of a Kaysam balloon, and here are more modern Kaysam balloons, the sort that are still being flown.

Q: These are just used for the typical meteorological type balloons.

A: Carry radio (inaudible), that's correct.

Dewey & Olney have gone out of the business and Kaysam bought them out. Here's a Kaysam balloon that is made by a dip mold. This is somewhat indicative, I think, of the way one of those balloons of the type we're using. As you can see on exposure just to ordinary light, they discolor. But these are balloons that were made probably in the '70s. As they change with plasticizer and anti-oxidants for ozone, they certainly change in appearance. The balloons we...

I have pictures here, pictures in the hangar. There, as you can see, these are the ivory colored balloons of the sort we were flying. This is the balloon you just found the eyelets on in the hangar. These are pictures from the 1947 era where we're getting ready to fly the 15 foot H.A. Smith balloon.

Q: The reinforcing tape on these balloons, these polyethylene balloons, we were told is a type of acetate. It had none of this symbology, is that correct?

A: None at all.

Q: So the symbology on the tape was only related to the radar reflectors.

A: That's correct. Here is a later model polyethylene balloon, and it's a little thinner than the ones we were flying, but there's a polyethylene balloon.

Q: It looks like polyethylene sheeting that I would use to cover up...

Q: I've also heard the early balloons described as carrot bag quality. Material they would use in a carrot bag. Dry cleaner bags.

Q: Dry cleaner bags. We think of them as being very fragile, but materials from this time frame have been described as durable -- something you couldn't tear with your hands.

A: That's about two mil polyethylene here.

Q: Obviously, you could tear this.

A: This was four mil. These balloons that we had... That's Flight 8. These are the little balloons here that are seen from the air.

Q: From a B-17?

A: I think this was a C-45. We did, indeed, have B-17's attached to us, and C-54's. But I think this was trying to chase Flight 8 down. This was one of the candidate flights that I thought might have been, until two years ago, I thought might have been an explanation for what occurred.

Q: Why did you change your mind at that point?

A: Because of that newspaper report right there.

Q: Because of him saying that he actually found the material in mid-June?

A: No, because he said it was balsa sticks and smoky rubber and had those curious markings on that. That's a very vivid memory I have of these markings on the radar targets we flew.

Q: You said you often wondered why those markings were on there. Had you ever resolved that for yourself?

A: Only what Albert Trakowski told me, that our friend John Peterson, the procurement man, was just joking, "What else do you expect when you have your targets made by a toy factory?"

Let me go back, if I may. Colonel Duffy was assigned to extract meteorological equipment out of the Signal Corps in 1943. There was a great argument that went on between the Army Air Force and the Signal Corps. The Signal Corps didn't want to let any meteorological equipment out until he thought it was perfect. At the same time, General Arnold was expanding for a global war, and was trying to get meteorological equipment all around the earth. So Colonel Duffy got assigned to expedite the equipment. As various of us graduated from the meteorological cadet schools, he took those of us with engineering backgrounds and assigned us to bird dog various things within the Signal Corps engineering laboratories. I got assigned to... I ended up with some appendicitis and got pulled off of an overseas shipment, and while I was recovering I got assigned to prepare this manual that Colonel Duffy, he was unhappy with the rate at which Signal manuals were coming out so he wanted a loose leaf arrangement to send things out. So I got assigned to prepare this manual.

At the same time, then Captain Fletcher was assigned... Duffy had heard that weather was giving trouble to radar, so Colonel Duffy just turned around and said, "Gee, you mean radar can pick up weather?" And ended up with Captain Fletcher being assigned to both convert this for looking at storm clouds and also to make wind measurements. There was a big problem, the Weather Bureau prior to World War II determined upper winds merely by releasing a pilot balloon, following with the (inaudible), and estimating the rate of rise, and then from the elevation and azimuth angles and the assumed height after a certain time, to calculate what the winds were.

Q: Is that the Boford Scale?

A: Well, Boford was Navy, that was the Navy...

Q: Like taking a Pi Ball reading now.

A: Exactly. It was called a Pi Ball then and it is now. Colonel Duffy pushed very heavily to get electronic means for measuring winds aloft. There were two approaches. One, use a radar target, and the SCR-584 with which you may be familiar -- the early gun-laying radar. Colonel Duffy talked to the field artillery that was procuring through the Signal Corps, gun-laying radar, the SCR-584, which is, that's this radar right here.

Q: We've seen that photo before.

A: This is Spilhaus's book. So Fletcher ended up with a whole bunch of his own 2nd lieutenants around. There was a Jud Tibbett from whom I have a photograph showing an earlier model target, the A Model target. Istvan was one. There are a bunch of them listed. This listing is for you if you'd like to have it.

Tibbetts ended up being the big installer of radar and, in fact, was assigned down to the Tulerosa Range Camp to make wind measurements for the Trinity shot, the test in 1945. As far as I know, that was the first time these targets had been used in New Mexico. Tibbetts, who until recently lived in Albuquerque, he's now moved to Scottsdale, Arizona. Tibbetts says that he did not ever fly this kind of target in New Mexico, which will be of interest with you when they talk about, that people should have known what a target looked like.

Q: Right. There were discussions concerning having radar targets, but supposedly the B Model and subsequent models were brand new, had never flown anything like that in this area.

A: According to Tibbetts, the A Model had bit aerodynamic drag. It was a flat plane of aluminum foil and had two triangles coming down that made a corner reflector. The A Model looked like... Then across here was that. This is one surface, this is another surface, and this is yet another, and they were held by

strings from these four corners. Obviously, trying to take something that's almost a meter in cross section, a meter on a side, take it sideways up through, gave a lot of drag, and it took a lot of lift to make the balloons rise very rapidly.

So instead, somebody came up with this smart idea of this other arrangement of a corner reflector that had much less drag. These, according to Tibbetts, weren't distributed until something like November of 1945. As far as I know, as you will see in the various correspondence, there were no SCR-584s which were required to track them, issued to the weather services here in New Mexico. Obviously, after the Trinity shot, there was no bit military operation that required wind determination in New Mexico.

Q: So essentially you'd say there were no radar reflectors in New Mexico until 1947 until this appeared?

A: That's my opinion.

Q: Was Major Pritchard doing any kind of balloon project?

A: No. He and Dyvad and others were at Watson Laboratories. I understand from Trakowski that Alamogordo Army Air Field was about to be closed down as surplus. The people at Watson Laboratories seized on it and were able to keep it on active status for two projects -- one, the radar project from Watson Laboratories that was set to track the V-2 being flown from the proving ground across the Tularosa Valley; and Project Mogul.

I joined the NYU group in January of '47, and while I was finishing up at Georgia Tech I had talked to my chemical engineering professors, I'd already been recruited by Duffy and Spilhaus, and I asked if you wanted to make a balloon of non-extensible material, what plastic would you use. My professor named Grubb told me you ought to consider polyethylene. It's a new plastic just now becoming available. You can heat seal it. It has a lot of desirable properties.

So as soon as I got to NYU, I began talking to everybody I could find in Manhattan -- DuPont, all the sales offices...

Q: We saw your listing.

A: I was concerned with where we could get the plastic and who we could get to manufacture the balloons. I was in my 20's, just a recent graduate. I knew nothing about manufacturing. But we did try to get a manufacturing company that would fabricate balloons for us.

During that period we heard of the Navy project that was going on at General Mills where Jean Get was planning to make a flight to 100,000 feet. General Mills at that time was making

balloons out of a Goodyear film called pliofilm. It was a vinyl chloride that just went to hell when exposed to sunlight. It really came apart. So I'm very proud that we began pushing them for polyethylene balloons. With some difficulty we got Otto Winzen who was the entrepreneur and promoter, working with Get, and we got him to make these balloons you see here in the design that was being planned for Project Helios, with the pliofilm balloons. At the same time we got an entrepreneur who was even faster acting, and that was this fellow A.J. Smith. A one-man shop. He would do anything for money. He, indeed, did. With no great technical background, he made a number of these balloons for us.

Q: Kind of a garage type of affair where he would sit down and make them one by one and...

A: I don't know. He got some girls and got some assembly workers, for a contract from us. Anyway, we got these balloons going, made visits to Minneapolis to push General Mills. The pressure from the Air Force was enormous. There was a similar problem, of course, in developing microphones that would pick up low frequency sound waves with Columbia. There was much enthusiasm, in testing these microphones.

Q: How did you come to join the Army Air Force?

A: When World War II broke out I applied for pilot training, and so did everybody else. Because I was a senior at Georgia Tech in a chemical engineering course with a fair amount of thermodynamics and other things, I got diverted into the meteorological cadet program. I still wanted to be a pilot but I got diverted into the meteorological cadet program, and the next class that I could join didn't start until December of '42. I joined up sometime in '42. So I went through the meteorological cadet program and found I was a lousy forecaster, but I did end up, when Spilhaus came recruiting for people with engineering background, I got recruited into Colonel Duffy's liaison office.

Q: Was that directly for General Arnold's staff?

A: I was assigned, believe it or not, to Headquarters, Air Force... I still have the Headquarters Air Force [rondelles]. I ended up being assigned to Headquarters, Army Air Force. I was a second lieutenant.

Q: So you got recruited by, at that time, Captain Spilhaus.

A: Right, and I got sent to the Weather Equipment Technician School in Spring Lake, New Jersey, essentially Fort Monmouth. When I finished the training course for radiosonde and for maintenance of equipment, I was headed for North Africa, and I had a medical problem. When I got out of the hospital, I was assigned back to Colonel Duffy. I remained there. I finished

this manual in '44. I was commissioned in September of '43, finally, and then finished the school in November, was assigned to write this manual which was finished in the summer of '44, and then I got an assignment to China.

Q: With Dr. Spilhaus?

A: No. I ended up being the weather equipment officer for CBI and the Spilhaus came over later. At that time the war was going very much better. Spilhaus and Duffy had a long range storm detection system, the spheric system, the predecessor of what's used now for lightning detection, the storm scopes, and the LLP. If you're familiar with LLP, the lightning location system...

Q: Used by the Weather Service.

A: We have one of the stations here on campus. And we actually have, if you're interested later on we'll go over and show you, we have a map of the lightning strokes over the entire U.S. as they occur. We have a read-out right here in our laboratory.

Q: So you're doing that work from China?

A: Spilhaus came over with the spherics net, it was called, and got a station installed in Chianting, China to work, of course, for the bombing of Japan. So Spilhaus came over I think the summer of '45 is when he came over. We had the radio wind, the ra-win, the SCR-658s, we had a number of them that were being installed. We had one up in Yunan in the communist area; we had several of them in China for getting good wind measurements. Spilhaus had been involved in that. I think by '45 it was clear that things would be over relatively soon. We thought we'd be back in '48. In any event, he got an assignment over to 10th Weather in the summer of '45 and came over.

Q: At what point did you ever hear the term long range detection?

A: That's a good question. I didn't know the name Mogul until Robert Todd told me two years ago. I'd never heard the name Mogul -- the classification was that high. I knew what we were doing. When "Helgoland" was exploded in April of '47, we had balloons in the air. We launched balloons out of the Watson Laboratory, actually Eatontown, what had been the Eatontown Signal Laboratory, but I think it was now Watson Laboratory. In any event, we launched a string of balloons, even though we didn't have [constant-level] balloons, we still carried microphones aloft and a C-54 orbited overhead and followed the balloons out to sea. I have no idea about the results that they got.

Q: Did you number that balloon flight?

A: No, we didn't.

Q: Not a letter or a number?

A: Wait a minute. The answer is, I don't know.

Q: If you did give it a letter or a number would it be on... There are some of these flights that appeared to have no sequence number and they were talking in terms of being service flights and the impression that we got was that the service flights were either test flights just to check the balloons out or they were the highly classified flights where the information was not being logged into essentially an unclassified document.

A: You notice that Flight 1 was made from Bethlehem, Pennsylvania.

Q: The football field there?

A: LeHigh, exactly. That's where we did it, from the football field. And we did this because a professor at NYU had just gone to head up the physics department at LeHigh and he invited us over. His name was Frank, Butler keeps coming to mind, but I'm not sure that's the right name. Anyway, we went there and that was for an early, early attempt for Helgoland. I think the Helgoland explosion got scrubbed, but we had balloons in the air from this and we were woefully not ready. We had all sorts of problems. We adopted the balloon technique that a cosmic ray investigator at NYU, a fellow named Sergei Korf, we adopted his technique and we had a lot to learn. We got our hands torn up with nylon line being pulled through it as we couldn't hold the balloons down in the wind...

Q: Speaking of nylon line, were these braided type lines or were they monofilament type lines?

A: Neither. I think initially we used either parachute cord, which was braided. I don't remember the details of what we used, but we rapidly used that the radiosonde cord we used was not strong enough at all to hold the forces that came, so we went to what was called lobster twine. We used a lot of lobster twine that was twisted, a laid line that was used in lobster nets.

Q: Do you recall there ever having been some sort of monofilament similar to the monofilament fishing line in any of the projects?

A: I think there was none available at that time. My memory, the answer is yes, we've used an awful lot of monofilament and we use it now all the time.

Q: But at that time you don't think it was available?

A: I think it was not available.

Q: The early nylon line, would it have degraded, such as the balloon material degraded, and maybe fused in the hot sun?

A: I doubt it. If we had any it would have been white, which would have been a high (inaudible), would not have absorbed a lot of sunlight.

Q: There were discussions about what appeared to be unbraided or unstranded fiber type lines. It's been alluded to that was the precursors to what we use for fiber optics today. The materials that were found. That's why I asked about the monofilament line.

A: A lot of what we used early was a linen cord, not twisted, and it was indeed, a brown, a dull brown color. But because it was designed just for radiosonde balloons, and we rapidly exceeded its strength. So very quickly, and I don't know when, but we very quickly went over to this twisted lobster twine.

To answer your question, there are three flights that are missing here -- two, three, and four. I've identified Flight 4. Flight 4 was a flight we made, and you don't have it there, but Flight 4 we made in Alamogordo something like June 2nd or 3rd of 1947. The reason I have it identified is I have Albert Crary's diary. The scientific end of the group was heavily based from Columbia University. It was Dr. James Peoples who was an employee of Watson Laboratory, and there was an Albert Crary who had been a graduate student under Dr. Ewing.

Q: Who later also was an employee of...

A: Who was then an employee of Watson Laboratory. I have Crary's diary. Here is a translation...

(END OF SIDE)

A: ...Here is the diary starting May 24, '47, and on May 28 he has "B-17 from Watson with Mirs, Hackman, NYU and Alden, they plan to test fly balloons tomorrow. Other gang with recording equipment due to leave Watson Laboratories Saturday. Got everything ready for Hermes Rocket today."

May 29th. "Mirs and Hackman got balloon ascension off at 1:00 p.m. today without plane to follow it. Don and Godby out to Donyo. Bill and I out to E. White Sands to record Hermes."

I've marked the key things here with red, and then I've given you a page without my red if you have any need for that.

June 1st, "C-47 with Moore, Schneider and others from NYU, also Irewin, Minton, Olson, NYU men worked on balloons, north hangar."

June 4th, "Out to Tulerosa Range and fired charges between 0-0 and 0-6" something. "No balloon flight again on account of clouds. Flew regular sonobuoy mike with cluster balloons and had good luck with receiver on ground but poor on plane." I think that's Flight 4 right there.

Q: So that's June 4th.

A: As to that flight made by Mirs and Hackman earlier, we have no record of it here in the NYU summary.

Q: If he flew that on June 4th and it carried the microphones, the radar reflectors, that would have been with a neoprene type balloon.

A: There were no plastic balloons delivered until the 28th or 29th of June that year. So everything as evidenced on the Helgeland flight that we made and the other flight, they were all meteorological balloons prior to late June.

Q: That would have also had the B Model reflector, this type of reflector, but the B Model?

A: My memory is that Jim Peoples, because we were being sent down by B-17 and by air, didn't let us take the radiosonde receiving equipment which at that time was very heavy. It was like a 500 pound rack with a receiver, frequency meter, recorder, etc., and we weren't allowed to use that. Instead, the idea was that Peoples would provide tracking on the balloons with radar targets and so on. So this is where I think the radar targets come in. If you look in these reports you'll find here statements, radiosonde reception, and you'll see 60 percent with recorder, 50 percent without recorder, 100 percent without recorder for June 5th. A hundred percent without recorder.

So I think we tried the radar targets, as I remember, our contact who was a Captain Larry Dyvad found that they weren't able to track our flights at all. They had a radar that was entirely aimed at looking at the missiles. To look at slow moving balloons with poor signal return was difficult for them. So we started off with making single target flights. I think we went to multiple target flights, and still didn't have any success, so I began putting radiosondes and then just audibly, as the tones would change, I would log it on a piece of paper. I'd count the pressure... Are you familiar with radiosondes?

Q: Somewhat.

A: The commutator with the pressure contacts, etc. I would count contacts and record it and you'll see in some of these flight reports, there's two different interpretations possible, depending on what the contact sequence was. An ordinary radiosonde is very good for something that's going one way. But for something that's going to go up and float, you can

have ambiguities. You don't know if it went up or down when you get the next pressure contact switch. You'll find that sort of uncertainty in describing the report.

So I'm quite sure that as a result of the failure of the radar tracking, I went back and started using radiosondes even though I didn't have the right equipment.

Q: You mentioned a few moments ago the Watson Laboratory gear, the microphones, and it was also Columbia that was developing the low frequency microphones. You had all of that gear on these balloons, is that correct?

A: No, not on all of them. That mention of a sonobuoy microphone, in the early... While the improved low frequency microphones were being designed and built, we flew on balloons, believe it or not, sonobuoy used to detect submarines. We were flying sonobuoy microphones on the balloons.

Q: But the material that's been identified as Watson Lab gear shows up as very generic in all of these reports and things. That was all part of Mogul also, is that correct?

A: That's correct. I think what happened is because the Watson Laboratory radar wasn't very successful, I think we made a number of flights like this. I think I sent a sketch like that to you. We made a number of flights like that which was an unorthodox use of radar targets, and it's my opinion that the thing that caused the debris that was picked up was probably from a cluster of meteorological balloons carrying a cluster of targets.

When something like the idea of a cluster balloon was not only to carry the weight, but was also to keep the target in the air for a long time. If one balloon burst, we still would have enough buoyancy for awhile to keep the thing airborne. When it would come to the ground this would drag along the ground and get shredded, but this would still be carried downwind until another balloon would burst, whereupon this one would start getting shredded. So I think the explanation of why things were over such a large area was, indeed, because it was a cluster, it was multiple targets and cluster balloons.

Q: Of course the issue of the large area has been different in different reports. Different people have stated the 200 yards, Cavitt in his description, described it in terms of his living room which was not that large.

A: Even a single target, if it came down, wouldn't have filled a single living room, but a multiple target, begins dragged sideways and then blown transversally by any later winds, could have filled a reasonable area.

Q: And left pieces of debris everywhere. Depending on...

A: What the wind did.

The description that Brazel gives here that everything would weigh about five pounds when it was all together, is more than you would have gotten from a single balloon.

Q: Those were measured in terms of 300 to 500 grams or something like that?

A: Three hundred and fifty only. At that time we didn't have any bigger balloons than 350 grams, so the balloons would have been 350 grams.

Q: About one pound.

A: Correct. And the targets are nominally maybe a quarter of a pound.

Q: Those targets are only four to five ounces?

A: Here was the specification spelled out for it. Approximate weight, 100 grams. These, as I say, are somewhat heavier than the ones we had.

Q: You indicated that the balsa wood was coated with some sort of glue such as Elmer's glue.

A: That's my memory. It wasn't completely coated. Some of it was and some of it wasn't.

Q: Some of the balsa wood is fairly dense, as far as being durable, and one of the descriptions concerning this "wood-like" material was that you couldn't dent it with your fingernail. So if you have a fairly dense balsa wood coated with a glue, it may be quite possible that a person would not be able to put their fingernail in it.

A: That's correct. It's my memory that the reflective material was more aluminum foil than here. These are second or third iteration targets, as evidenced by this picture, wherever that picture is down in here of the 1948 flight. It certainly looks more aluminum-foil like.

Q: What year were you discharged from active duty?

A: '46.

Q: Before you left active duty, while you were still working with Duffy and Spilhaus, did they invite you to join the staff at New York University, or to continue your studies there?

A: I came back from overseas and was assigned to Colonel Duffy's, he had a little flight detachment assigned to him with a B-29 and a B-25 and some other aircraft. I ended up being the

executive officer of a flight detachment at Newark Airport. I got back from overseas in February of '46, I think. After getting out of the replacement depot, I got assigned back to Colonel Duffy and was assigned at Newark. I went on terminal leave something like July of '46 and went back to Georgia Tech and finished two quarters. I had two quarters to finish at Georgia Tech. While I was at Georgia Tech I began working with a microwave, an anonymous propagation research group that turned out, oddly enough, was under Colonel Duffy's direction. I didn't know it. It had nothing to do with my getting deployed there, but I had a student assistanceship working on that.

I made some report, and my name came back in front of Colonel Duffy in September, I think, of '46, and I got asked to come up to his office. I think he was still at Bradley Beach, Sharp River Hills Hotel there near Belmar, New Jersey. When I was there, who should come in but Spilhaus. They told me they had a problem involving balloons and asked if I would be interested in working with them, and they offered me a graduate assistanceship at NYU, and I wanted to go to graduate school in physics, so I was delighted to have that opportunity. That was either September or October of '46.

Q: So Spilhaus, since he was on the staff there, he invited you to come to New York University.

A: Yes, he did.

Q: So you went to New York University when?

A: Right after Christmas. January 1, 1947. The program had already started. I presume you have all the details. I have a copy of (inaudible) letter to General Spaatz. I presume you have all of that.

Q: I believe we do, but I'd still like to review it and make sure it's the same letter.

A: In any event, there was a big push. I guess after Operation Crossroads the first nuclear test in the Pacific was in July of '46, and Crary, because of the long range detection concept, Crary was sent to Ascension Island which is the antipode for, as close as they could get to the antipode for Bikini, and failed to detect any signal from Operation Crossroads, from the nuclear explosion.

Q: You mentioned detection. What drove the aspect of detection? Was it because of our test?

A: Yes, our test was being used as a signal source. The question was in order to detect any Soviet test, could we detect our own tests. So Crary was essentially sent to Ascension to see if he could detect the nuclear explosion.

Q: He was unsuccessful?

A: He was unsuccessful.

Q: What method did he employ?

A: Low frequency microphones on the ground. Are you familiar with the Krakatou measurements?

Q: No.

A: In 1883, Krakatou, near Java, made an enormous explosion and the pressure wave from that went around the world seven times, and was picked up and... There was a report, a big analysis by Lord Railey and others...

Q: A volcanic eruption?

A: Volcanic eruption. Here are the isocomes of the pressure waves from Krakatou as it went out. From the time it took the signal to go out and come back, he went to the antipode which is around Colombia or Venezuela, and came back as a big spherical wave. It went back and forth around the earth. The British investigators were able to show that there was a duct up around the tropopause, and the speed of sound, as I remember, was something like 310 meters per second instead of the regular 334 that we had at sea level. From that they could deduce the temperature of the medium in which the sound was propagating and it was something like minus 25.

Q: How was this detected as a pressure wave in that time frame?

A: Barograph.

Q: What year?

A: 1883. This is what prompted Ewing.

Q: I'm familiar with barometer-type measurements being used to measure that pressure wave and the fact that it traversed the earth, you said seven times.

A: Maurice Ewing had been an oceanographer at Woods Hole and had found a similar acoustic duct in the ocean. You may be familiar with what's called Sofar. In 1945 he wrote a letter to Spaatz suggesting this might be useful in detection of Soviet activity.

Q: The 1945 letter was kind of the initiative as a means of detection.

A: That's correct. That caused the Army Air Force to begin this research.

Q: How did you come in possession of it?

A: Todd. Todd does everything.

Q: Did he say where he got these documents?

A: Freedom of Information, I think.

Q: It looks like National Archives. I believe I have this letter.

So Ewing was at Woods Hole...

A: And was going to head up the geophysics department at Columbia. These are subsequent documents of people in the Air Force considering the desirability of it.

After Crossroads there seemed to be an enormous push to try to put microphones into the sound channel. During WWII, the Signal Corps had laid on them the requirement to develop a constant level balloon. It had not been very successful. I knew a bunch of people in the balloon branch.

The reason I got into balloons is that while I was working on this manual there was a great problem in the winter of '43 with the supply of gum rubber cut off, meteorological sounding balloons weren't flying very well. In the summer time, the balloons would go through the depth of the troposphere, but in the winter time, the balloons began bursting down at levels of 15,000 feet or so because the neoprene wouldn't stretch at low temperatures. Somewhere Spilhaus came up with the idea, talked to somebody in the Weather Bureau, that maybe you ought to heat the balloons. He told a couple of us second lieutenants, that I wonder if that would work. We got a blow torch and a mop bucket and we had a radiosonde, and he was in charge of the Air Force push on radiosonde technology. I was his leg man on that. We put a blow torch on a mop bucket and heated the water to boiling and flew the balloon. Much to our surprise, the balloon went to about 60,000 feet.

Q: So it stretched without rupturing.

A: It turns out that neoprene crystallizes and you can make it back into an amorphous state with high elasticity. Elasticity changes as a function of the degree of crystallinity. By heating, we removed that.

In any event, there was a group in Spilhaus's detachment known as the balloon [boilers]. The Signal Corps, it turned out, was very unhappy with this idea. They wanted no interest in it at all, and their manual doesn't use it. But that was my introduction, that's how I got attached to ballooning, as a result of doing this simple thing for Spilhaus.

It's of interest, in the Holloman report there's a big talk about boiling balloons. That's certainly a heritage of the association from our early balloon boiling days. When you look at the instructions on the modern balloon, you see that it is really a physical effect that can be controlled.

Q: You went on board at New York University, and you immediately set out, as documented in the reports, acquiring the various materials, [putting out bids], things of this nature. At that point you were working at New York University under the direction...

A: Spilhaus was the nominal principal investigator and director of the project, but he just turned us loose.

Q: So you were the project engineer?

A: I was the project engineer, and Schneider was the project administrator. We employed a lot of students, a lot of people that we could, and were a mixture of trying to develop a constant level balloon and providing service flights for Peoples. Peoples was entirely our contact.

Q: He would come to New York University?

A: He would go down to Red Bank. He'd call and say he wanted certain things, can you do it, so we made this flight out at Lehigh and then we made the Helgoland flight down at Red Bank, and he wasn't really happy. There were all sorts of constraints flying balloons in the New York City area even then.

Q: All the problems with air traffic and getting FAA, or their equivalent at that time, approval, etc.

A: So up in the stratosphere above my level, a decision was made that we go to Alamogordo, and there would be a big flight. We had balloons promised, but even ahead of that time people wanted to test microphones. He had Crary already, about from December of '46, I think Crary went to Alamogordo and ran a field station and...

Q: That field station was for ballooning in general?

A: For Mogul. It was more than that. Crary was operating sound-ranging microphones on the ground there. He was having bombs dropped off the New Jersey coast and trying to pick up the acoustic signals in New Mexico.

Q: He was having the bombs dropped in New Jersey, off the coast, and trying to detect them in New Mexico?

A: That's correct.

Q: What technique? Balloon borne?

A: No. We were the balloonists. This was all ground-based stuff. There was also an operation in Bermuda. Then later you'll find...

Q: Crary also initiated that?

A: He was in charge of it. He was running it. They went and got a whole bunch of 500 pound bombs out of the Earl Ammunition Depot in New Jersey. Later you'll find that they did a bunch down in the Canal zone. Then eventually they went to Alaska.

Q: This was prior to '47?

A: The New Jersey, and I think the Bermuda operation, you'll find a hint in this diary I gave you, you'll find a hint about Bermuda and so on in there. He was talking about trying to measure the sky waves coming in.

If you're interested, we can go extract, there's a paper in the Journal of Meteorology in something like '47.

Q: I believe I have that. Is that the same one?

A: No, this is by Crary.

Q: Crary did quite a few publications for Red Bank and then for Cambridge Labs.

A: Correct. But you'll find one, I think it's either '74 or '49. If you want we can go over to our library and make you a xerox of it.

Q: I'm familiar with that one.

A: It's very circumspect as far as classified matter.

Q: So Peoples and Crary had Columbia University affiliation?

A: Well, Watson. They were derived from Columbia. Both of them were derived... I think Peoples got his PhD under Ewing at Columbia, and Crary didn't get his doctorate until later.

Q: You said Crary's ground station was Alamagordo, but he was actually doing explosions in Alaska, off Bermuda, Panama, the Jersey coast.

A: In the late '46, early '47 era, he was in Alamagordo, in and around Alamagordo. He was very concerned about explosions off the Jersey coast and I think off Bermuda. The Panama Canal operation I think was not associated with Alamagordo at that time.

Here's a nice paper that came through courtesy of Todd. In '48 there was a big operation in the Pacific for Operation Sandstone, and we were heavily involved in that. Here's the Fitzwilliam... Schneider and J.R. Smith... My chief associate technically was a fellow named Dick Smith, James Richard Smith, who unfortunately, died two years ago. Smith and Schneider and some other of my associates went out on Sandstone to Kwajelin, Guam, and then Oahu.

Q: I've seen that in publication. I have to acquire it.

A: You can xerox it.

Q: Moving chronologically, Professor Ewing had affiliation with Woods Hole, and he was a meteorologist by trade?

A: No, oceanographer. He was a physicist, a geophysicist.

Q: What was he doing at Columbia?

A: I think he ended up head of the Department of Geo-Physics. I don't know the details.

Q: For the AMC contract he was developing...

A: He, as we, were contractors.

Q: He was developing the acoustical...

A: That's correct.

Q: That acoustical gear, this is a later flight but it's a fairly good depiction. It shows payload here, and payload is mentioned in a lot of the reports without any further elaboration, what the payload was. That was primarily the low frequency microphones...

A: That was their euphemism for...

Q: So as not to be able to talk about what was then a classified payload.

A: Here are the sort of instruments. A chamber with a leak in it, and then a method of sensing the pressure inside the chamber. That affected the frequency of an oscillator that came to ground. That's the sort of thing that was developed at Columbia.

Q: Dr. Spilhaus also mentioned about trying to detect particulate matter.

A: That was another operation. A Tracer lab, have you come across Charlie Ziegler at Brandeis?

Q: No.

A: He worked for a Tracer lab and is just bringing out a book on the early detection system.

Q: That was Project Center. MX-968.

A: There was another one that followed on this to measure krypton. It was called Grab Bag in our lexicon.

Q: Did you ever hear of the project Bequeath?

A: No. Being a civilian and outside, I was more knowledgeable, essentially, of the intent and what was required rather than the project names.

Q: What type of clearance did you hold?

A: At various times I had Top Secret and Q and I don't remember exactly when I got various clearances. I also had a clearance with the CIA.

Q: So at this time in New York University you were cleared but you had no need to know.

A: I knew exactly what we were doing. I knew about Helgoland. I knew, just being an atmospheric physicist, I knew about the sound duct channel and I knew what we were doing, but I just didn't know any of the operational details and I wasn't concerned with them.

Q: From a security standpoint, did anyone ever discuss with you, other than the letter that I showed you stating that this is now unclassified, did anyone ever tell you never to discuss any of this with anyone?

A: I can't say they did.

Q: It was just a matter of enforcing the need to know what classified project...

A: I guess I was aware this was highly classified, and having been in the military was aware this wasn't something to be discussed lightly. But no, I can't say that...

Q: The reason I ask the question is there are some statements made in the various publications and books -- the popular press, about people being threatened not to talk about things they had seen or that sort of thing. I just wanted to see if there had been anything stated to you never to discuss any of the activities either related to this project or any other project.

A: There's a gray area here. I was certainly aware that what we were doing in Alamagordo was highly classified and was well aware, and I guess had been perhaps encouraged to have a suitable cover story to explain what we were doing.

Q: So you were encouraged by whom to have a cover story?

A: Probably by James Peoples, who was our scientific monitoring... As you may be aware, there is a former colonel, later General DuBose, who makes a statement that something was a cover story. When I read this, I was not at all surprised. I interpreted that as saying someone was covering up on Mogul. That was my interpretation when I read what was attributable to General DuBose. So from his point of view, there were certainly no threats, but we were aware we weren't supposed to be talking.

Q: So was it Dr. Peoples then who actually actively said use meteorology as a cover story, or...

A: I don't remember the details, to be truthful...

Q: But it was kind of a natural thing to think of in terms of meteorology?

A: We were careful around NYU with the various technicians we hired. We kept our knowledge of what we were doing to ourselves. It's certainly my memory that we were aware that this was classified, but we weren't threatened. We were just instructed that this sort of information was not to be passed out, even though the technical aspects we understood. So the answer is yes, we very well understood this was classified; and second, there was no physical threat or anything like that. We were instructed not to talk about it, and until Todd told me that Mogul had been declassified I was very reluctant to say anything about it.

Q: Anywhere in the early days were you ever aware of involvement by General LeMay?

A: Not at all.

Q: Not at your level. How about the [AFOAT-1] study group?

A: I became involved with them later on Project Grab Bag and others, and I knew a bunch of people in [AFOAT-1] -- Doyle Northrop... I knew that, but later ballooning got even more heavily involved in various classified things.

Q: Where were your duty locations involved with [AFOAT-1]?

A: Probably at General Mills.

Q: Not ever in Washington?

A: Oh, yeah. I visited people in Washington.

Q: Just for the record, Major Marcel later worked at [AFOAT-1]. Do you recognize him at all?

A: Not at all. The people I was involved with were civilian scientists. If we looked at a list of people at Northrop, Doyle Northrop sort of sticks in my mind, and there are other names I've seen related to that. Yeah, I knew that guy, but I never knew Marcel.

Q: So you went, moving into Mogul, you did go on the June and July field trips.

A: I ran them.

Q: How many did you go on? All of them?

A: I didn't go to the one in the Pacific. If you look at the planning on the Project Fitzwilliam, my name was listed as the person as being there. Then suddenly, I'm not. What happened, my people got taken away from me and I had to recruit brand new people to help me fly balloons into Alamogordo during the April and May 1948 operations. So I had new personnel, and we went up and down the Rio Grande Valley trying to launch balloons so they would pass over the ground stations at Alamogordo.

Q: During that early period, before you had your full complement of various types of balloons, did you ever use any of the Japanese balloons? We were given the impression there were at least a few of the Japanese balloons made available.

A: I got very interested in the Japanese balloons and communicate, and I have pieces of the Japanese balloon downstairs if you're interested in seeing a piece of it. And I've got translations. I met the chief of the Central Meteorological Office, a Dr. Wadati, and he put me in contact, so I have extensive files on the Japanese balloons.

Q: But were any of those used as precursors to Mogul or...

A: None whatsoever. That was part of a promotion that... When I went to General Mills, Winzen who had been the great entrepreneur, had gotten fired. He'd gotten caught in a prevarication about whether or not the Navy was going to provide money. He was replaced by a fellow named Frank Jewitt. Jewitt recruited me out of graduate school. We really promoted balloons. That's part of the balloon promotion.

Q: None of the Japanese balloons were actually used as far as a precursor to Mogul or anything like that.

A: That is absolutely correct.

Q: But you had them available for study, but you didn't launch them.

A: No, they didn't have any.

Q: In the New York University report it says that you were provided two Japanese balloons.

A: That's interesting, because I have no memory of them whatsoever. Spilhaus may have. But I have no memory that I ever saw them. In the spirit of being given proper scientific credit, in the paper that you have, the Journal of Meteorology Paper, we, heavily written by Spilhaus, credited the Japanese with doing, with their trans-Pacific flights. So what we were doing certainly was based, came after what they had done, and we didn't want to take credit away from them. But I'm told that on my own, completely free from this, I talked with Wadati and others on a Japanese balloon. I've never seen a Japanese balloon that I know of, I've never seen the payload, but I do have fragments of the Mulberry Favor.

Frankly, we did not depend on the Japanese balloons. The Japanese just preceded us. But we didn't pattern what we were trying to do on what the Japanese did. After all, they had opaque balloons, and my belief from the beginning is balloons ought to be transparent so they don't absorb sunlight so at sunset you don't have the cooling and the ballasting. So we owe nothing to the Japanese other than the fact they were ahead of us.

Q: You went on these field trips. When you left, getting back to the cover story, you were the project engineer. Did people come to you and say you need to put something together in case one of these things falls in somebody's hands?

You didn't.

Did you brief your people, your personnel, when they were there, that they if should go into town for food or something if someone says "Why are you there?"...

A: We were certainly secretive and not talkative, but at the same time...

Q: In other words, was there a developed cover story where everyone got together, discussed what you were going to say or not say concerning the various activities that were going on at Alamagordo and other locations?

A: That's a good question. I have no memory of such a thing. I'm just aware that we were under very strong stricture not to encourage speculation on what we were doing.

Q: So is that pretty much maybe a condition of hiring? I notice you used a lot of former military people. Did you just tell them at the outset, "This is a classified project for AMC?" Or were they not read on to the project at all?

A: By and large, people thought we were flying balloons for the Air Force.

Q: As far as they were concerned they were just launching meteorological balloons?

A: That's correct.

Q: They didn't particularly quiz you about the microphone you hung in there or...

A: No.

Q: The balloons that you did launch for Project Mogul and some of the other test balloons, without the actual instrument packages, did they have reward tags, "Return to New York University," or "Return to Roswell Army Air Field," or to Alamogordo Army Air Field or anything like that?

A: The ones that we wanted to get back, which were the test constant level balloons and the ones that had microphones on them, by and large, they did have NYU reward tags on them.

Q: Dr. Peoples, whoever was directing you, was there ever any concern voiced that this is a top secret object we're sending into the atmosphere and we're not sure where it's going to come to earth. Did they ever express any problem with that, that wherever it came down, it came down?

A: I think the argument was that when it came down, it would be mixed in with our other gear, and it was just part of a flight that was to be recovered by NYU. He thought nobody would interpret what those sorts of instruments would be.

Q: So the tags were kind of generic, like a meteorological tag, say. "This consists of meteorological instruments..."

A: "This is a research balloon flown by New York University..."

Q: Were you doing other research? When you went to New Mexico was there another agenda other than the top secret project?

A: None whatsoever. Our whole life revolved around the NYU constant level balloon project. We were developing constant level balloons, and the service flights for Peoples just sort of got hidden in that.

Q: The service flights were which ones?

A: The ones carrying the microphones.

Q: So specifically that term was used for the microphone flights from...

A: That's right. You'll notice when you look at this, that the flights out in the Pacific don't even get mentioned. There's just no report on the flights in the Pacific, and the flights in '48 that we made for Sandstone, there are some flight numbers recorded, but there are no details at all provided.

Q: That was Grab Bag?

A: No, Grab Bag was to grab stratospheric air to measure the krypton 85...

Q: Essentially particulate detection and gaseous...

A: That was gaseous. The particulate was, I think we were less involved in grabbing particulates. There have been thousands of flights made, and certain people did carry cascade impactors and other things, but that was a minor part of what we did, whereas Grab Bag was a very measure effort.

Q: That was in '48?

A: That was more '50 odd.

Q: Was that Fitzwilliam?

A: No, Fitzwilliam was entirely acoustic detection. Again, very long range detection. Fitzwilliam was spring of '48. There were various code names, and thanks to our friend Todd, I've learned about the code name got termed Black Heart and a whole bunch of odd names...

Q: Black Heart, Rock Fish. He may be wrong on that part. He may be right, but...

A: I heard Mogul got converted into Rock Fish. But I heard the detection part of Fitzwilliam ended up being called Black Heart.

Q: He may be in error on that.

A: As I say, I'd been much more concerned with the technical aspects than the military operations.

Q: This is one of the technical reports and it's talking about the various flights, and this is the report that lists all of the numbered flights and it talks about, it says, "Excluded are the flights made to test," it's technical report number one,

"Excluded are those two tests' special gear in launches which were not successful."

A: Right.

Q: So the special gear that's referred to here is the microphone gear?

A: Yes, sir.

Q: There's another passage that talks about the intelligence gear. Was that considered also...

A: Did we make such a faux pas as that?

Q: It's in there.

Q: I have the classification letter from July of '46. You might want to review this. Maybe your friend has shown that to you.

A: No, I've never seen this.

Trakowski argued that even the name Mogul was classified, and he said it had the same classification as the Manhattan Project had, which surprises me, because in various reports that Todd has sent me, such as the monthly progress reports from the people at later Holloman Air Force Base, Mogul appears in things that are no higher classification than confidential, but Trakowski insists that Mogul was super classified.

(END OF SIDE)

Q: This is a copy of the letter you wrote to Colonel Weaver. One of the things that you talk about in this letter was that the radar test flights were not reported, which is exactly what we were discussing a moment ago in your kitchen. Would you go over again what you just described as far as this particular test flight that occurred? What we just went through in there.

A: As I said initially, the essence in trying to develop constant level balloons, we needed to know what the altitude was. At the same time, we were under a lot of pressure to carry the test microphones for the Watson Laboratory and Columbia people. We got into an operation at Alamogordo in early June of 1947, in which we were required to make flights in which the tracking of the flights would be provided by the Watson Laboratory Radar that was already in place at Alamogordo for tracking the V-2s and other rockets the Ordnance Corps people were flying over at White Sands. So we came down to fly balloons in early June, in which the tracking of the flights was to be done by radar, tracking corner reflector targets, which I think we brought with us. I don't have any evidence of this.

Q: So you made your plan in New York to fly... Your primary research was the acoustical detect...

A: That's correct.

Q: Secondary was refining the technique of constant level balloons.

A: And that was on hold until we got the delivery of the polyethylene balloon that was scheduled for the end of June. So the first of June we came, really, just for the test flight of microphones, doing service flights for Watson Laboratories.

Q: To fly the balloons in association with...

A: To fly meteorological balloons, tracked by a Watson Lab radar on the ML-307B targets that I think we brought with us.

Q: And you launched these balloons in conjunction with V-2 firings?

A: Those went independently. Albert Crary was monitoring the V-2 firings.

Q: That was with the ground microphones?

A: You're right, I beg your pardon. As you'll find in the diary, that we launched Flight 8, these cluster balloons, we launched those at 3:00 o'clock in the morning for a V-2 firing. You're quite right. I'd forgotten that. We launched those in the morning, then the rocket got scrubbed while Flight 8 was in the air, and we were out of plastic balloons that day in early July -- this is jumping ahead to early July -- and we inflated meteorological balloons for the delayed firing of the V-2 rocket on the afternoon of July 3rd, you'll see. Then there was an accident over at White Sands and the V-2 got scrubbed a second time. What was Flight 9, we launched Flight 9, as you will see in here, as a dummy flight, and it probably had radar targets on it.

Let me just read this. This is Crary's summary for the week of 30 June-5 July 1947. "Balloon tests 7, 8, 9, and 10 off this week. Test 7 slated for July 1 postponed to July 2nd because equipment not ready. A hundred tanks with helium obtained from Amarillo Monday evening. Trakowski went over in a C-54 and picked them up. Also radiosonde receivers set up by NYU but sonobuoy not operable. Test 7 at dawn, July 2nd, with Pi Ball. One hour, first falling with the autolights. Winds were very light, and balloons up between base and mountains most of the time. Included a cluster of met balloons, followed by C-54 several hours, and finally landed in mountains near road, south cloudcroft. Before gear could be recovered, most of it had been stolen. Station operating in north hangar, Cloudcroft and Roswell. Shots made repeatedly at Site 4 and picked up goods

from north hangar and from Cloudcroft for awhile. Nothing from Roswell.

"On Thursday morning, July 3rd, a cluster of GM plastic balloons sent up for V-2 recording, but V-2 not fired. No shots fired. Balloons up for some time."

Q: What is a shot?

A: Explosive on the ground.

Q: You were doing explosives on the ground in New Mexico too?

A: Crary.

Q: So Crary would give you the signal, he'd say at 0400 I'm going to launch a balloon, and at 0500 I'm going to...

A: No, he wouldn't launch a balloon. I'd launch a balloon. What Peoples would do is say I want a flight up tomorrow morning. So the NYU group would get ready to make a flight, and then Crary would go out with his crew and fire explosives up and down the Tulerosa Basin while our balloons were in the air.

Q: So you had multiple explosions on the ground, the V-2...

A: And explosions on the East Coast.

Q: On the East Coast, Caribbean, and you had those timed so you knew when those were going to take place and you were simply waiting for...

A: They had them timed and we balloon types just fit into the schedule. But the master, the timing, bringing all this together, we knew nothing about. We were just scheduled to fly balloons.

Q: But you did want to launch early morning for the light winds.

A: We did want to launch early in the morning for light wind. We had freedom to tell them what we could do and what we couldn't do. We actually on this, in addition to everything else, we actually flew blocks of TNT on free balloons and fired them while we had other balloons in the air.

Q: Did those have radar targets on them also?

A: Probably.

Q: Were those detonated by...

A: By a pressure switch.

Q: Were those tracked? Was there some sort of log that would tell you where those particular balloons were? You wouldn't want to just release TNT to float anywhere, would you?

A: They wouldn't float. The balloons would just go up until they burst. And we were on the edge of the restricted area. So the answer is yes, we did.

I'll have to get back to this. The radar tracking turned out to be abysmally poor. I don't know why, but they were abysmally poor. That's why I got off onto this part of it. And when you asked me the V-2 question...

Let me finish this, and then we'll get back to what you asked.

"Thursday morning, cluster of GM balloons sent out, V-2 not fired, no shots fired. Balloons up for some time, no recording. Pi Ball showed no West winds. Balloons picked up by radar, WS." I presume that means White Sands. You'll find this hard... and hunted by somebody's name I couldn't get. It looks like Maryalls' "C-54, located on Tulerosa Range by air. Out PM with several NYU men by weapons carrier, but we never located it. Rocket postponed until 7:30 p.m. Thursday night," which was the third. "But on last minute before balloon went up, V-2 was called off on of accident at White Sands. Sent up cluster balloons with dummy load. Balloon Flight 10 on dawn, July 5th, had gone out with C-54, again with Moses and Dufeld to hunt for Flight 8 but not sure was found then."

Then I added a note here, "Flight 8 was never recovered."

"C-54 went to El Paso July 4th and picked up single smith plastic balloon and GM cluster plastic balloons."

So the answer is yes. We did try to coordinate the balloon launchings for the V-2 firings, and Crary would also take that as a time of opportunity to go out on the desert and fire TNT. He had vast stocks of explosives available to him.

Q: Was that primarily on the White Sands range, or did he go out into other areas, say Northwest of Roswell? Did he contract with any of the ranchers to use these locales, other than the actual missile range itself?

A: I think all the explosions he made were coordinated with the White Sands Proving Ground people. Alamogordo Airfield, later Holloman, was just on the fringe of the proving ground at that time. Crary sent his men to all sorts of places -- over to Roswell, to Artesia, to Hagerman, up and down the Pecos River area. He had a place you'll read about, Fabians, Texas, which turns out to be just down the Rio Grande from El Paso, maybe 50

miles. Then he had Don Edmondson went to Silver City frequently. Then he had some place he called Donna, Las Cruces is in Donna Anna County, but I don't know where his Donna site was. But I think he had microphones scattered all around in central New Mexico and West Texas. But the explosions were all created either on the White Sands Proving Ground, or there were V-2 rockets, or they were things coming from...

I won't take the time now, but he talks about cruises, which apparently are, maybe they were cruisers firing off the Jersey coast.

We got off into this, we were talking about tracking, and we went down to, in early June, to make service flights which were to be tracked by radar, and the radar was unsuccessful. It's my memory that we made a number of flights just to test out the radar. These would not have had a reward tag on them. These were throw away flights. Once a target like this comes down from high altitude or drag, you don't want it back. It's my memory we didn't want to have anything traced back to us, if we weren't going to go out and pick it up.

Q: So you just kind of let the material lie wherever it fell?

A: We shot a balloon into the air and didn't want to do any more. There are some pictures of our going out to recover things. On one of the early flights we went out east of Roswell, and I remember beyond the Bottomless Lakes, going out in oil well country, picking up one of our flights that had come down. We aggressively tried to recover our own flights.

Q: So were you directed to that location by aircraft?

A: By the aircraft.

Q: Did they give you a lat and long, landmark?

A: We talked to them by radio. The transmitters on these microphones were so low powered that, believe it or not, they had B-17s just orbiting under our balloons with receivers aboard the aircraft, and we, of course, would talk to the aircraft, and they'd tell us when things would come down. So it was a coordinated operation.

Q: So you had explosions or V-2 going through. So the aircraft had recording devices. You had the acoustical pickup on the balloon and the aircraft had the recording device that would record the sounds.

A: That's correct. Would record the signal from the balloon.

Q: In what media was it recorded on?

A: Brush recorders. [Strip charge] recorders feeding out at high speed. You'll see in here, you'll see the sort of records.

Q: The graphic representation.

A: The recorders looked like that.

Q: So that was recorded on the aircraft and then...

A: That's correct. As you'll see, they said they had receivers at Roswell, at Alamogordo, and they had them on the airplane.

Q: But most of the detection was via the aircraft because of the low power receivers.

A: Most of the reception, the detection, was really... The balloon received the acoustics, and sent it down by radio to the aircraft. It often didn't work. That was the reason why for Operation Sandstone in April and May of '48, we went up and down the Rio Grande Valley... Here are some of the pictures. There's a ground cloth for the balloon to be laid out. There's a balloon being inflated, just getting ready. So we tried to get up wind.

That's a device from White Sands that was picked up around Carazoso and was reported in to us, and we thought it was one of ours. So I took a weapons carrier and drove up there. We were aggressively trying to recover our equipment and that just happened to be something that was on the ground. The technician that had been in that group, remember the [Marginal] tape, Herbert Crow. That's a picture he took when we were aggressively trying to recover a load. That turned out not to be ours.

Q: What is it, and who did it belong to?

A: It probably was flown on a rocket or by Marcus O'Day who was the chief scientist at Watson Laboratory. Dr. O'Day. You'll see, when you read the Duffy thing, where Duffy thinks maybe there were things that were flown by Dr. O'Day. Anyway, that just happens to be a picture in the collection of NYU photographs.

Q: So there were a lot of other people flying balloons or launching...

A: Not balloons. We were the only balloon flyers. That came down by parachute. But there were a lot of rockets being flown in the early days there, and a lot of high altitude aircraft. Duffy says there were dropsondes.

Q: So it could be that some of the material found may not have been associated with a balloon. It is possible it could have been some other type of material. But the description that

Brazel gives the impression that it is the smoky rubber of a balloon that's been in the sunlight.

A: That's circumstantial. That fits exactly with what would have been done, and orthodox use of radar targets would not have produced what he found. But you're quite right, there's debris that was reported to us that...

Q: ...some sort of cylindrical instrument, though, that's obviously an instrument package of some sort.

A: It had a plexiglass, it looked like maybe it had a UV sensor. There was some optical equipment under the plexiglass dome that was shattered...

Q: You're familiar with the popular literature about the various crash sites. There's one crash site, two crash sites, three crash sites and all that craziness?

A: Yes.

Q: What I'm thinking is we may have two incidents here, where they collected your debris from your radar targets, and then there may have been another something else not related to a balloon.

A: There could have been other things from White Sands. This was on the edge of the proving ground. There's a story behind this, and that is that a rancher, whose land had been taken from him to form the proving ground, had cattle that were still on what had been his land. He had found this while he was looking for his cattle, I can show you on the map if you're interested. Anyway, he called in to Alamogordo about this. So I went up to see if it was one of our missing balloons. While we were there, a range security guard came on the rancher and really castigated him for breaking the law, coming back onto the range. So this was really on the range. It would be hard for me to understand how the sort of operations, which I knew, could have fallen as far away as these other sites you talk about. This was really on the northeast corner of the range, just west of the town of Carazoso.

Q: So that's not too far from here.

A: Here's the northeast corner. [Looking on map] Right on this road, right about there is where that load there was found. Here is where the Brazel finding was, just north of this bend of the road here, and there's Roswell.

Q: You're talking in terms of sites around Corona and in that vicinity. So it's quite possible that there had been other types of debris from the proving ground or...

A: As I say, I find it hard to think that something... While we may have been flying TNT on balloons and being very carefree about it, I really doubt that a thing of any military significance would have fallen this far away from the proving ground. It could have, but...

Q: Other than your balloons.

A: Oh yeah, those first flights we didn't even coordinate with CAA. Peoples was so eager to go get those measurements, that these were going to be flown from a restricted area and he didn't worry about it. We later, before the Civil Air Board in El Paso, but that was two or three months later.

Q: When you went on the field trips, what was the chain of command at that point when you arrived? Who did you report to?

A: We were somewhat self contained, but we got housing provided by, I guess Crary was our contact, if you will. Some way or another, barracks were made available for us to live in at Alamogordo.

Q: Would anyone at Roswell Army Air Field have known about your activities, what your purpose was?

A: Not at all. In fact, we went over and tried to get into the weather station at Roswell and because of the atomic bomb security of the 509th, as I remember, we couldn't even get on the base. We drove up in a weapons carrier to the Roswell Army Air Field, and tried to get on the base because we wanted to go to the weather station, wanted to see if we could put a radiosonde receiver there. As I remember we got turned away.

Q: But you ultimately did put a radioson receiver there.

A: In a motel. We just worked out of motels in Roswell.

Q: I thought I saw you had a radioson receiver on Roswell Army Air Field.

A: Again, forgive my memory, but I do remember being turned away. But if you can find it, I'd be glad to have my memory refreshed.

Q: I saw that you had a copy of the 509th Bomb Group history. In the 509 the Bomb Group history from September I saw a meeting where Dr. Peoples met with LTC Joe Briley, 830th the Bomb Squadron Commander, 509th, Air Group Roswell. Do you know why Dr. Peoples would meet with the squadron commander of a B-29 outfit?

A: Only if he wanted to get in to put a receiver on the base there. That would be my guess. We had a big operation. We went back to Alamogordo in September. We had our first 20 foot

diameter General Mills balloons. We had a very successful set of balloon launches in Alamogordo in September of '47. My only guess is trying to have a down-wind receiving station.

Q: There are some other names mentioned that I can't recall.

Q: What about then Colonel Blanchard and General Ramey? Do you think they may have had any knowledge of what your ultimate purpose was?

A: I think not. I want to say something about Colonel J.D. Ryan. He was Chief of Staff of the Air Force later, but "Dr. Peoples, Murray Hackman, and First Lieutenant Thompson from Air Material Command, were out at the field to inspect Air Material Command installations and to confer with LTC Briley."

Well, well. Hackman was one of our radiosonde operators. There's Colonel John D. Ryan right there. That's interesting.

On the morning of this famous press release, July 8th, in The Roswell Daily Dispatch, there is a statement about a flying disc being identified, and Colonel J.D. Ryan who is on the staff of 8th Air Force said that the Air Force was now using radar targets to measure winds aloft in some stations.

I find that of interest because apparently in reading some of the various things that happened in General Ramey's office, apparently someone that afternoon did think this was a radar target that had been brought in. But the Roswell morning paper clearly showed that there was a knowledgeable person in Fort Worth.

Q: Is that in the article, the 8 July article, that Ryan made the statement?

A: Yes. Maybe not the article you're talking about.

Q: Is this the one that William Haut...

A: No, this is that morning, not that afternoon. (Pause to look for clipping) There's Newt Goldenberg, you mentioned him earlier in one of our conversations. That's one of our altitude controls.

Here's the morning paper, "Report flying disc found." Down here is about Colonel J.D. Ryan, and he mentioned the existence of radar wind measuring equipment in the Air Force. If you want a copy of that...

Q: Then there's, subsequently, no mention of the radar targets until General Ramey discusses it on the 9th, talking about the material being a balloon.

A: On the afternoon of the 8th. It may have been published on the 9th, but...

Q: You're right. Evening of the 8th. Examination by the Army revealed last night, a high altitude weather balloon. General Ramey, Commander, 8th Air Forces, cleared up the mystery.

A: In these pictures here, don't show these flaps. This, I think, is my step ladder that I used to reach high targets, when we have these big balloon trains going way up in the air. Here again, is an unorthodox use of radar targets. We did that, and as far as I know, other people didn't.

Q: Did you ever use radar targets with the polyethylene balloons?

A: Yes, sir. In fact somewhere I have a picture where we flew a missile, we launched a missile for O&R Special Devices Center in 1949. I have a picture showing the targets up and down the balloon train there.

Q: Do you remember trying to pin down some of these flights that could possibly cause this misunderstanding? You talk about putting a target with the neoprene balloons, but at that time you also launched them with the polyethylene?

A: This picture I showed you right here. This is a polyethylene balloon.

Q: So you used a visual by the aircraft to watch the balloon? It would circle underneath.

A: The aircraft circling underneath were really to pick up the microphone signals. That was part of the Watson Lab operation. Our operation, we depended on radiosons and where we could get radar tracking for tracking air balloons. But the aircraft operation here was entirely to support Project Mogul. We didn't consider ourselves Mogul because I didn't even know the name.

Q: The summary of flights...

A: That's one of the flights with the mixed interpretations because of the radiosondes.

Q: In one column it says "tracking percent." Then sometimes it will say by aircraft.

A: That's true.

Q: So "aircraft observation", was that a visual observation or an electronic?

A: That's really saying did we have aircraft on it or not, and what percentage. Here the B-17 was on it for 40 percent of the time. Indeed, that was the aircraft tracking for the Mogul operation.

Q: That was for the electronic data gathering.

A: That's correct.

Q: Not observing the balloon to tell you where it went down.

A: That's right. Well, we did have the aircraft stay as long as we could. As long as we could end up with that very expensive aircraft chasing an air balloon, we were happy. On the flight that came down east of Roswell on one of these, Flight 5 or so on came down east of Roswell, the aircraft spotted it on the ground for us and told us where to go to look for it.

Q: About 17 miles east of Roswell.

A: Then we had another one, Flight 11...

Q: That's the one that appears to come down northwest of Roswell.

A: Correct.

Q: It appears to have almost come down exactly where they're talking about.

A: That's right.

Q: That's the one where you provided a depiction to Colonel Weaver.

Q: No, that's another one.

Q: That's an earlier one, that's right.

A: Where is that old NYU report? (Pause)

Here it is right here. More or less due west of Walker, Roswell Army Air Field.

Q: Then this graphic conflicts with this graphic, which shows Number 11 coming down... Is that circle the Roswell reporting station?

A: That's about right.

Q: Is this circle a weather reporting station which would be Roswell?

A: You're right.

Q: This has it coming down northwest.

A: What's the origin of this?

Q: It's in the back of one of the reports.

A: It looks to me like it may have been out of this report.

Q: Not every report had this graphic depiction like this which was number eight.

(Pause to look through documents)

A: With those numbers it wouldn't have been in that first report because these flights were much later.

Q: Technical Report No. 1.

A: Right. And Flight 58 and 55 aren't going to be in that early report. They occurred after that report was written.

(Pause)

A: I would say what was in that first report is more accurate than this. This, I think, occurred after I left NYU. It's a general summary. Flight 11 was a very important flight. They got very important data on it -- Crary and Peoples.

Q: Spilhaus based his article from Journal of Meteorology on it.

A: Right, and he wrote a paper in the bulletin. The fact that the balloon trajectory has this hook in it when it went over the mountain ridge...

Q: That's obviously the [ano-cyclonic] winds aloft.

A: Exactly. So he and Bernard Harwitz were very excited about the fact that the balloon at nominal constant level, had a change in direction when the air was forced over the mountain barrier, and they published a special paper on that. So everybody was happy with this flight.

As soon as that flight was made, that was the 7th, and we went home on the 8th.

Q: That would be the reason why there would be no one there in the area who could explain this debris that was brought in. There were no experts there who dealt with this particular type of material or radar reflectors.

A: There was really no contact, at that time, as far as I know, between Peoples and Roswell, and there's no way Roswell, other than my memory of getting turned away by the MPs at the gate, there's no way that the people at Roswell would have known what was going on over at Alamagordo. When we sent people to Roswell, Hackman worked out of a motel to receive.

So the more puzzling thing in line with what you say comes from Crary's diary. Here's what Crary's diary says: "Alamagordo. Balloon Flight 11A, off at 5:07. Big plastic balloon with small auxiliary plastics," etc. "Watson Lab and gear." "Followed" (inaudible) "receiver until about 11. Picked up on radiosonde receiver at Roswell then followed. Then came down. At 10,000 feet, cap should have punctured plastic. Then it came down near Highway 70, between Roswell and Tulerosa.

"Second balloon, met balloons with radiosonde up about 6:30. Third balloon with two and a half pound stick of TNT and cap set by pressure element set to fire at 35,000 feet, up at 6:20."

Q: What day is that again?

A: July 7th.

"Surface bombing at Site 4 from 5:45 to 8:45 at 15 minute intervals. (Inaudible) followed main receiver only three-quarters of an hour, but followed radiosonde about three hours. Thirty-five thousand food implosion? off about 6:55. Vivian got instructions for completing work on Flights 1 to 30 and packed all records and photo. Sent off TWX regarding Bermuda flight and wrote up memo on it. Worked with Eileen on April 1st rocket plotting HD5 HT SST, whatever [that is]."

July 8th. "C-54 off about 10:30 with 23 people, all NYU, Watson Lab including Vivian, Eileen," and somebody else. I can't tell. "Lieutenant Thompson, Edmondson, Reynolds and myself left. Wrote a report on East Coast flights for Peoples."

Here's 9 July, the time this occurred at Alamagordo. "Worked today on balloon flight. Studied Watson Lab records of them briefly and wrote memorandum to Peoples about results. Left in car this PM later. Flat tire between Roswell and Tulerosa, and stayed there."

July 10th. "Changed tire and went into Roswell. Bought new tire. Off to El Rino, Oklahoma today. Stopped in cafe in Hereford, Texas and met Danny Hard from UGC. Went up to office and saw Bob Cowden, somebody in charge, and supervisor."

That's the end of it. So there's no hint that Crary was involved in any coverup such as this clearly is. This is a coverup right here because they talk about our operations, they talk about our balloons we thought went to Colorado, and they all claim it to be part of Pritchard's radar operation.

Q: But he wasn't launching balloons.

A: He wasn't launching balloons.

Q: So where did they get the equipment to take this picture? Did you leave equipment behind?

A: This is right outside of the hangar.

Q: Those are your people?

A: It's our equipment and my stepladder.

Q: Did you leave equipment there?

A: Yes. Everything

Q: Because you expected to return.

A: We were just going back...

Q: It looked pretty tricky. How did they know how to do that?

A: I just don't know anything about the hierarchy above us. I do know that I worked carefully with a guy named Larry Dyvad, a pilot, who later became a private pilot, running a fixed base operation in Alamagordo, and got killed 20 years ago. But I know I worked with Larry Dyvad whose name you'll see here. I don't remember Pritchard at all, but Dyvad was my contact with the radar. I know they didn't have balloons or anything else, yet they talk about boiling balloons there.

Q: So when you returned in September, did you see that somebody had tampered with your equipment and used up some of your balloons?

A: If it did, it didn't ring a bell.

Q: And no one mentioned it to you. No one said hey, look, we had to do something while you were gone.

A: I think we were just some ignorant, little innocent graduate student contractors on a military base, and things were going on that we didn't know anything about.

Q: So no one approached you to say they had used some of your equipment?

A: Not at all.

Q: This photo that's depicted here in the July 10th Alamagordo News, this could have been taken during one of your actual launches versus...

A: I think not, because they say, the whole article is this was a demonstration. I would have thought, since Crary was a senior person and he and Peoples, Peoples was our contact with the base. But other than Dyvad, we had no real contact with anyone I remember. I do remember being very disappointed with the radar.

Q: If this were a demonstration sometime on the 9th or 10th of July, prior to this being published, they talk in terms here of these radar reflectors. These particular radar reflectors, as having labels on them. The radar reflectors you were using, did they have any type of labels talking about being property of U.S. Army, or Watson Laboratories?

A: None that I know of. We were strongly encouraged not to mix in the Air Force with what we did. Everything we did had an NYU label. I may be able to dig back in my file somewhere...

Q: So they may have had an NYU label on it. Even the service ones.

A: On service, but on radar test flights, there's no way we would have put a label on.

Q: Those were just shakedown flights. You were just saying hey, what's going to work best to get the data, so let's use some of the equipment we have and see what works, so you'd have someone on the radar and say yeah, this configuration works, this one doesn't. That's what you were doing. Then later on you refined your technique...

A: What we would do is we would put up things and they'd come back and say it didn't work. So we'd scratch our heads and do something else. But we were running that end of the balloon end of the operation. Nobody else was flying balloons around us. There may have been a radiosonde operation out over White Sands, but there was not one, as far as I know, at either Roswell or Alamogordo. If there had, I would have used them because we were using standard AMQ-1...

Q: But you did coordinate with Big Spring, Texas.

A: Did we?

Q: It's in the report, saying you guys, when you came back to New Jersey, you were sending thank you letters to various organizations that helped you while you were in the field. Big Springs, Texas; some other places that you had coordinated with.

A: Thank you...

Q: The New York University reports are very voluminous. There are three big bound volumes. I have the originals with your signature.

A: You're making my point, that there probably wasn't any other nearby radiosonde station for us to receive things. I'd forgotten all about Big Springs, but I'm sure we made every effort we could to get radiosonde reception.

Q: Can you think of, just in general, any other explanation for what became the so-called Roswell incident, other than what we've discussed here as far as potentially your balloon project, which at that time was a very secretive project. Is there any other explanation you can think of?

A: No, and the particulars of this case are sufficiently nearly unique, that I think no one else had anything that could have fit into providing these results. No, we were doing something that was unorthodox, using targets that, as far as I know, had not been flown before in New Mexico. There's no way that the rancher could have ever seen one. And there's no way that either Major Marcel nor General Ramey or General Ramey's people could have come up with providing a radar to substitute for the real debris. I think there's a very high likelihood that the unusual things we were doing provided this debris.

However, all the other stuff that's in, and a lot of the material, I can't explain bodies or material that can't be [folded] by a sledge hammer.

Q: Let's dwell on the bodies just for a second here. It turns out that during this time frame, 1947, 1948, 1949, there were numerous aircraft accidents, a lot of fatal aircraft accidents, in this general vicinity. Did you all ever come across any of those?

A: No, sir.

(END OF SIDE)

Q: There was an accident that took place right out of Roswell, a B-29, two B-29 accidents that resulted in fatal crashes. We were wondering if maybe over time people were beginning to think in terms of those fatal accidents, which essentially scattered body parts, small parts, over areas, where people were getting confused with what occurred in those aircraft accidents with the sensationalism of this UFO story.

A: As I said in my letter, all of us went back to NYU on the 8th of July and we heard about that afternoon, and we just thought it was one of our balloons. All of us that were in that group have held onto that view for a long time. I do have Crow's letter here. He apparently joined us for that Operation Sandstone pickup crew in '48, but he knew that we knew that we

thought the Roswell incident, so-called, was caused by one of our balloons.

Q: Did anyone ever mention it to you once you returned? Did any of the Red Bank folks mention it to you, or even in passing, or told you that maybe you'd better tighten up your procedures or anything of that nature, or a memo?

A: I have no memory. I do think that Peoples had the idea that it was one of our balloons, and it wasn't a matter of tightening up our procedures, it was just one of our balloons we couldn't recover. As you'll see looking at Crary's diary, there was no frantic effort to recover the earlier flights, even though they had microphones on them. I read to you one about some equipment had been stolen by the time we got there. As you can see in the diary, there's no record that there was any major problem.

Q: So even though the equipment was taken, there was no shroud of secrecy, the MPs didn't come out and close down the area or anything of this sort.

A: No, not at all.

Q: It was just expected in the normal course of research . Expendable equipment.

A: Expendable equipment.

Q: And you had no fear that it was going to be taken by enemy agents or...

A: No, the biggest fear was the thought of loose talking, and we just didn't talk about the purpose of this. We certainly did talk a lot about our balloons, and there was just no security or no concern. We were flying constant level balloons.

Q: For pressure and temperature...

A: For meteorological trajectories. A lot of interest in trajectories.

One thing I should mention is that after I had visited from William Moore around '80 or '81, I wrote Ro Peoples and at that time Jim Peoples was in the Geology Department at the University of Kansas. I wrote him and got a letter back from Ro Peoples saying that he had died. So I wrote her back and said there was considerable interest still in this Roswell incident, and did he ever get called out... I do know that on occasion he got involved in classified things and left us. I asked her did he ever talk to her about anything regarding this debris that had been recovered. Her letter, which I perhaps can find somewhere, was the fact that no, he thought that flying saucers were a bunch of hooey, and he had a very low opinion of people who believed in

flying saucers. I did get a letter back from Ro to the response that he had not been, as far as she knew, he had not been involved in any classified identification of something. That had occurred to me that things could have gone on that I had no need to know. I tried to extract that.

Q: So you had no recollection or strong recollection of him, when you got back to New Jersey, discussing it. It caused a lot of fuss.

A: I'm really surprised at this newspaper story because implicit in this is the idea that someone provided a good cover for us, and yet Crary's diary doesn't show that he was involved in it, and I wasn't aware that my contact, Dyvad, was privy enough to our operations to have carried this out. So this is a bit of a mystery to me.

Q: What would you speculate, how would someone, just circumstances, coincidences, or intentional?

A: It's very clear that it was intentional, and there was a better security operation going on than I appreciated at the time. That would be my assessment.

Q: So you believe that someone was privy to your activities...

A: Trakowski was there. I had forgotten, but he reminded me that he had gone on the C-54 to pick up the helium at Amarillo. I asked Trakowski had he been involved in manufacturing a cover story. He kept saying how important Mogul was, how highly classified it was, and how he was really wheeling and dealing. He apparently went down to Fort Bliss, to the commanding general there -- I guess he was a captain at the time -- and had no trouble talking the general into releasing something like maybe several hundred 500 pound bombs for this. At the same time, Trakowski has no memory of a coverup.

Q: He didn't have participation.

A: Whether he was on that C-54 that had 23 people on it or not, I don't know. Crary's list of the people left, there was only one military type, a Lieutenant Thompson, in what you have here.

Q: Who did you report to?

A: Peoples.

Q: Then getting back to talking about quarters and things like that, did you have to go introduce yourself to the commanding officer at the base, or...

A: That's the surprising thing. As far as I know we just never interfaced with the military.

Q: Where were you actually operating from?

A: We operated out of the north area of Alamagordo Army Air Field. This hangar right here, which was a big wooden hangar, on the south side of the ramp in the north area.

Q: That was arranged by Peoples?

A: Crary was already resident there when we had arrived.

Q: That's right. He arrived first to establish the ground stations first.

A: Correct. As you'll see in this, he was already firing explosive for the GR-6, the various sound-ranging microphones.

Q: Did he have a cover story for those ground explosions and the microphones?

A: I don't know. There were very few enlisted men on the airfield. As Trakowski said, it was about to be closed. There was a motor pool, because in the stuff Todd has dug up, there were a bunch of weapons carriers being requisitioned. We certainly had some brand new, good ground transportation that was just turned over to us. We civilians were driving weapons carriers to carry helium around, and to go into town to get meals, etc.

Q: So you operated from Alamagordo Army Air Field. You did not operate out of White Sands.

A: That is correct.

Q: There is a difference.

A: A very strong schism between the ordnance people across the valley 50-odd miles at the proving ground, and the skeleton group at Alamagordo Army Air Field.

Q: So there weren't many people at Alamagordo.

A: Correct. The main people I have a memory of were the people operating what sticks in my mind as either C-5 or an M-5 radar. I knew the Signal Corps designation, the SCR-584s and 270-s, etc., but this was some new radar that had a bigger dish on it and was on the north side of the ramp. It would have been... This is looking toward the south. You can see here, those are some old abandoned, those were barracks used to handle air crew during training of World War II. They were all closed and dusty and we didn't use them. We were in barracks down somewhere on the main base. But we were just in an enlisted

men's barracks down on the main base and there was a mess hall that we ate lunch in, ate our meals. We were up at odd hours, as you can see, these 3:00 o'clock launchings.

Q: Who did Alamagordo report to? You indicated it was Fort Bliss?

A: No. There was a commanding officer, and I'm not sure which command he was in, but the people in the north area were all, if you will, tenants. We didn't use that word, but we were all associated, one way or another with Watson Labs.

Q: So Trakowski then, his reporting chain was...

A: His reporting chain was Watson Lab to Colonel Duffy.

Q: There was no real interface, Trakowski had no real interface with the Alamagordo people or anyone else around 8th Air Force.

A: There were some fancy orders that gave him a position to talk to the commanding officer and get what he wanted, to arrange what he wanted on the basis of orders out of Headquarters Army Air Force.

Q: While you were operating, doing your procedure, did it take a security monitor type person or security officer to come by and just say I wanted to see how you were...

A: No interface at all.

Q: You don't remember any strangers poking around or....

A: No, just absolutely nothing. We were just a little bunch of civilians there on an almost deserted base, doing what we wanted.

Q: Going back to the orders that you mentioned, were these some sort of special orders different from what we would typically see as military orders?

A: You'll have to talk to Trakowski on it, but my opinion is that he had orders that came from a fairly high level that introduced him and let him do what he wanted to. As the research changed, he didn't have to go back and get new orders. He was in the position of doing what Crary and Peoples wanted.

Q: Like Jim and I have blanket orders that say we're authorized to go anywhere, essentially, in the world; but was there anything specific in those orders that said provide all assistance requested...

A: I suspect so. I too, have had such general orders -- do as someone may deem necessary. In fact I have a copy of my

1944 orders that say such things here. But you'll have to talk to Trakowski. My feeling is that he and Peoples provided the interface to the base and we just weren't bothered. We never saw anybody in security. There was certainly nobody keeping us secure. If anything, we were keeping ourselves secure.

Q: These are the pictures taken in General Ramey's office, 8th Air Force Headquarters by a news photographer of the Fort Worth Star Telegram. It's four pictures that show various people with some equipment, and I'd just like to know what you believe that equipment to be.

A: Joe Fletcher has written your friend Todd, and said there's no question that's a target. The only question is that there are people who allege this is a target that's been substituted for the real debris, and there are also stories where Marchelle said the picture in which he appears are the real stuff, etc. That looks very much like our radar targets. And you'll notice that this does look more aluminum foilish than what I have here. It's my memory that there was good, bright, aluminum metal foil, not painted stuff on the targets we were using. That looks like more than one target to me in the various pictures. That looks like the stuff we were flying.

Q: I think they talked in terms of being a rawin target in this book.

A: It's just radio wind. There are two kinds of radio winds -- the 400 megacycle transmitters tracked by the SCR-658, the old bed springs; and then the radar wind. Ray Win is the right way to say it.

Q: So the rawin would be a radar target that most of the officers and the weather people there would have been associated with, they would have some knowledge of?

A: Not really. As I say, these came out right at the end of the war. The warrant officer, I have a letter that he wrote Todd, I don't know if you've seen it...

(Pause)

Q: We've got this thing narrowed down to just a few flights. There couldn't have been... Due to your time frame, when you were there, the rancher went on the record of saying he picked it up the 14th or the 15th.

A: The 14th.

Q: So it would have to be in the June field trip, early in June. You had several service flights but you also had, you called them experimental flights. The experimental flights with the testing...

A: The ones in early June were all service flights. In other words, all flights we were making for Peoples, and we had some radar test flights.

Q: So to go with the June 14th date, what type of flight do you think would have...

A: All the balloons launched in that period would have been meteorological balloons, 350 gram meteorological balloons, some of them with radar targets just to test the radar out and some of them, I'd forgotten all about it, but Crary's diary says we had sonobuoy microphones on some of them. So that black box that Cavitt had really began to get my attention.

Q: That would not be a radiosonde.

A: That would not be a radiosonde.

Q: What would a radiosonde look like?

A: It would be a white, usually a cardboard or a plastic box, and the fact that we were involved in radar is because we weren't allowed to have our radiosonde equipment. We weren't all set up for that.

Q: You said you didn't bring it with you.

A: We didn't bring the receiver. I have to correct myself, we did attach radiosondes to them, to the flights carrying microphones because there's a statement in this summary here of radiosonde reception. Radiosonde recording. So I take that back. Yes, we had radiosonde. But we did fly this one mentioned here, on June 4th, out to Tulerosa range, no balloon flight, again, on account of clouds. By that he means none of their flights. Then "Flew regular sonobuoy mike on a cluster of balloons and had good (inaudible) receiver on ground but poor on plane."

Q: I notice early on you were going ahead with the Navy stocked sonobuoy while Professor Ewing was trying to perfect his technique of the low range frequency microphone.

A: Oh, the low frequency microphone, right. That's correct.

Q: He was experimenting with both AM and FM, is that your recollection?

A: In the laboratory, devices for measuring low frequency acoustic waves were well known, but what he was attempting to do was to modify these and devise something to be a throw-away microphone and radio transmitter, so this was to build an instrument for a certain purpose. He actually had a fellow named

Joe Johnston, the electrical engineer at Columbia, whose name will come up as the person who did these.

Q: But you think in these early service flights you did have sonobouys?

A: Initially we had sonobouy, according to Crary. We initially were flying radar targets on the balloons only. Then by about Flight 5, we'd had sufficient lack of results that we began putting radiosondes on.

(Pause)

Q: The end report we're going to write is going to be based on official records, and essentially, transcripts such as this. So there will be a lot of things, Cavitt's tape, the transcript will not be part of that. This statement will be.

A: If you remember, there's a note in there from Dave Atlas to Colonel Duffy, a copy of a letter. Dave mentioned somewhere or another that Colonel Duffy took him down in the basement and Colonel Duffy had trunkfulls of documents that were unclassified. I wonder if it would be possible for you to contact Mrs. Duffy...

Q: I was wondering about what she might have.

A: She may have a great deal. Maybe in the Duffy file I have the address and phone number. I think it's Barrington, Rhode Island.

(Looking for name and phone number)

A: Here's a letter Todd got having to do with chasing down modern targets, the people who now make targets, who know nothing about this earlier affair.

Q: We talked with the Signal Corps up at Fort Monmouth and that's where we got the copy of the engineering drawing, which is a copy for you. They said these targets are no longer made. They have a national stock number and they can be made, but they would have to go out and write a new contract for them.

A: This is the C Model. It doesn't show the reinforcements.

Q: The young lady I talked with at Fort Monmouth indicated this drawing pre-dated that time frame. June of '44.

A: I'll be darned.

Q: I found that unusual when she said that was June of '44, and I didn't pick up on the designation being printed on the

side. I thought the B Model was a 1947 vintage and assumed, wrongly so, that the C Model would have come later.

A: This, then, is really... So they didn't change the numbers. It does show the little swivel there, in '44. Well, as always, my memory can be improved.

Tibbetts, the radar lieutenant working for Fletcher, said that when they got these in '44 there was a lot of trouble with breakage in the air and they had to go back for reinforcement.

Q: That's where maybe the tape came in?

A: He said that's where the tape came in. Because it certainly doesn't show this. There's just no question in my memory, bad as it may be, that there was a tape there. That impelled me to drag out Herbert Crow's letter. While I'm finding that, here is a communication between Todd and a Warrant Officer Newton, who identified things in General Ramey's office.

(Pause)

Q: It says a material like mylar. Do you have any knowledge of when that term came into use? mylar is a polyethylene, it's a metalized polyethylene.

A: It's not really a polyethylene, it's a polyturpoline...

Q: I'm not a chemist.

A: It's really quite a different thing. We certainly got involved with mylar balloons in General Mills around 1950 or 1951.

Q: Nothing that early, though.

A: I think not. It was really quite a new plastic. This is mylar. As you can see from the appearance, it's really quite different than polyethylene. It's non-extensible, where this really stretches. This scatters light and this doesn't. We have flown mylar balloons and mylar balloons vacuum coated with aluminum, but I think we didn't fly any in this era. It would be my guess that someone is sort of confusing this with later things. There were a lot of mylar balloons carried on rockets, and it was called Jim's sphere. Someone named Jim came up with the idea of increasing the turbulence around a following sphere by putting a little protuberance, little combs out on it. That was Jim's sphere. A lot of them were flown to measure winds in the low ionosphere, flown on rockets, from White Sands. They could well have fallen, but to my memory, it would have been anachronistic, out of times.

Here's a letter to me from Herbert Crow who was one of my technicians in the 1948 operation. These pictures you saw,

including that debris, are pictures that he sent to me with that letter and a subsequent letter. These are pictures taken by Crow.

Q: When did Alamagordo become Holloman?

A: Probably about September of '47.

Q: It says HAFB on the back of the truck.

A: Those pictures were taken during the Sandstone operation in April of '48.

Q: I take it the side arm was for protection against rattle snakes?

A: Good question.

Q: Some of the popular writers have alleged that certain persons were turned away by armed guards, etc.

A: Not in our area.

Q: I mean as far as the so-called...

A: Oh, out at the ranch.

(END)

Colonel Albert Trakowski
29 June 1994

Q: We have connected independently from several other researchers the fact that Mogul is probably responsible for the so-called Roswell incident... The Air Force position on that is that it was a misidentified balloon. The balloon was not a weather balloon, but was then a classified project, Project Mogul, which has since been declassified.

What we have not found is any documented evidence that there was a planned cover story related to Project Mogul. Jim has culled through literally millions of pages in various archives and repositories trying to find some sort of documented evidence where somebody at some level has stated that a cover story of weather research or weather-related activities would be used for Project Mogul, the real purpose of which was nuclear detection...

(Pause)

A: ...All of that is to say that I know these people, and I know of what their involvement was, so I can at least give credibility and corroboration to what it was they did and where they fit in the picture.

There have been several writers who have been interested in this story and they have been in touch with me. I have given them a lot of words, and in some cases documents that I had in my personal files. They were at first a Charles Todd, from Ardmore, Pennsylvania, who was writing a story, and I never quite could determine whether he was on the side of the believers in UFOs or was writing to refute the believers. That I really was unsure of. One thing, he did appear to be sincere in getting the facts that surrounded the matter.

Another was a Charles Ziegler, a professor of physics at Brandeis University who was writing a monograph or perhaps a book on the history of nuclear weapons detection. It figured, of course, that Project Mogul would come into view. So he had done a great deal of documentary searching and had found some documents that I did not have. For example, the original letter from Maurice Ewing to Carl Spaatz, then Chief of Staff of the Air Force. And some of the original letters of General Spaatz directing the establishment of Project Mogul. All of this apparently Charles Ziegler apparently found, and I did not have them at all.

Another fellow recently came into view, a Carl Pflock from Albuquerque, New Mexico. He appeared to want to substantiate the existence of the UFO incident as a UFO. I have a tape here, a one-sided tape, my half of the conversation only, with him. You're welcome to listen to that.

Charlie Moore has been in it since the beginning. Charlie was not a general project scientist or engineer on Project Mogul. His efforts were confined to the development of the constant level balloons which were the instrument carriers for the devices that we hoped would pick up the sound waves operating in the sound channel in the stratosphere. The constant level balloon was the lifting mechanism, and Charlie was the principal in the development of that.

All of these things I have recorded on this tape to Mr. Pflock and also on the tapes that I made for Ruth Liebowitz, the historian at the Air Force Cambridge Research Center.

Maybe the best thing to do before plowing over all this old ground would be to consider some specific questions you may have. In the course of that, the history may come out.

Q: Were there any documents, or were there any directions either from yourself or from someone else up the chain to develop a cover story for Mogul?

A: Not to my knowledge, no. I have never seen such a document nor have I ever heard of any effort to develop a cover story for Mogul. The security of Mogul was a great concern of mine from the very beginning, because it was like trying to hide an elephant in an open farmyard -- almost ludicrous.

Q: Both Dr. Spilhaus and Professor Moore had indicated that they did use weather research as essentially cover stories when asked questions about what they were doing.

A: Correct. That we did. I'm aware of that. But it was not a policy. It was, if anything, a lash-up idea on the spur of the moment. And indeed, it was obvious. I may have been involved in using such a story myself, but to the best of my recollection there was no official stimulation or documentation of doing that. If you find such a document I, indeed, would be surprised.

Q: In the course of the research projects you worked on, in that time frame, the post-war period, would they give you a cover story on any particular project, even other than this one? Would they say this is what you do, to say this? Or would they kind of leave it to you, that it was a classified project and you just didn't discuss it and you just avoided questions?

A: The latter. I have no recollection of a cover story being used on any project that I was involved in, or that a prefabricated cover story existed. No. I never encountered any such thing. We simply treated the security classification

straight and did all we could to adhere to it.

Q: So you, as the project officer, you knew that Mogul was a Top Secret...

A: Did I know it? There was no way to avoid it. I was the project officer, succeeding Colonel Duffy, and all that history is in the tapes that I made for Ruth Liebowitz. I came into being as the project officer on Project Mogul about November of 1946. I had considerable background in nuclear weapons detection using devices that I had developed in the Signal Corps. I was an Air Force officer assigned to the Signal Corps as part of Colonel Duffy's office. Much to the chagrin of the Signal Corps hierarchy, I was appointed a laboratory chief in the Signal Corps for purposes of developing instrumentation that the Air Force required, and I did that. In connection with that instrumentation I conceived of an application of that instrumentation for use in detection of nuclear weapons. We conducted field experiments which at best were controversial, and at worst showed no positive result.

So my studies took me into the nuclear weapon problem. I had a background in physics, in nuclear physics and high energy physics and modern physics, so I had some understanding of what was going on. I then took over the development of the original weather radar prototypes that the Air Force required in 1946. I did that in 1946. From that position, I was transferred to Colonel Duffy's new position as project officer for Project Mogul in the Watson Air Force, Watson Laboratories. I took up that task, I believe, around November. Those dates I think are specific in the tapes I made for Ruth Liebowitz. November of 1946. Colonel Duffy was reassigned to Wright Field and I was the project officer. I was Top Secret control officer in addition to other duties. It being the only Top Secret project at Watson Laboratories at the time, probably ever. I remained project officer of Project Mogul through or move of the laboratory from Watson Laboratories at Eatontown, New Jersey, to Cambridge, Massachusetts, and combined my laboratory, which was then known as the Geophysical Research Directorate, with that of John Marchetti's Electronics Research Directorate, and the two components made up the Air Force Cambridge Research Center.

I continued in my position of the Director of the geophysics component until May of 1949 when I was relieved of the duty at my own request and returned to school at MIT.

Q: Up until '49 were you still on Project Mogul?

A: Yes, indeed. And Project MX-968.

Q: You were on-site in New Mexico when Charlie Moore was doing most of his work. Some of the early launches out of Alamagordo?

A: Yes. Jim Peoples and I went down to Alamagordo in early July 1947 to assist and observe the prototype launches being done by Charlie Moore and his crew from New York University.

Q: You said you went in July of '47, so you were there only in July. Was that early in July?

A: Yes, it was early in July. Again, I think those dates are in this tape of my conversation with Mr. Pflock. It was early in July. The Roswell incident occurred after I returned back to Watson Laboratories. I wasn't involved in it at all. Really the only thing that I knew about it, after it happened, was that Colonel Duffy called me on the telephone from Wright Field and gave me a story about a fellow that had come in from New Mexico, woke him up in the middle of the night or some such thing with a handful of debris, and wanted him, Colonel Duffy, to identify it.

Q: Did he identify who the person was?

A: No, I don't remember the person at all. I don't remember who came from New Mexico, no.

Q: Someone came from New Mexico with this debris?

A: Yes, I believe that's correct.

Q: They came to his quarters?

A: Yes, at Wright Field, yes. He had quarters on the base at Wright Field.

Q: His family there?

A: Yes.

Q: Did he identify the type of debris?

A: He just said it sure looks like some of the stuff you've been launching at Alamagordo and he described it, and I said yes, I think it is. Certainly Colonel Duffy knew enough about radar targets, radio sondes, balloon-borne weather devices. He was intimately familiar with all that apparatus.

Q: What was his position at Wright Field?

A: He was on the staff of General Tom Reeves who was Director of the Electronic Subdivision of the Air Materiel Command, and under whose purview the Watson Laboratories was run.

Q: Why did they bring this debris to Colonel Duffy? Why didn't they bring it to someone else?

A: Probably questions about who knows about this project, put to people at Alamogordo. I'm not sure. I can't answer that with any firm knowledge at all.

Q: So you had no idea there was an "incident" until Colonel Duffy called you, and you were back in Massachusetts at this time?

A: At that time we were at Eatontown, New Jersey. But what you said is correct. I had no knowledge of the so-called "incident" until Colonel Duffy called me.

Q: Do you recall what day you actually departed Alamogordo?

A: No. No, I don't. I have a full file of my TDY orders upstairs. Right off-hand I can't tell you, but I was back in Watson Laboratories for several days before Colonel Duffy called me.

Q: Do you recall there being a Major Pritchard on-site?

A: I remember the name, yes.

Q: Did he work for you at Watson Laboratories?

A: No. He didn't work for me. I don't recall him working for me. I only had one major working for me, and I was a captain. He was a dull fellow... Right off-hand I can't remember.

Q: You were the Chief of the Applied Propagation Subdivision.

A: Yes.

Q: I've seen the organizational chart, the way those things go...

A: I was.

Q: You were at the top, and then down below, as a technical adviser, below your name on the chart is Major Pritchard.

A: Is that so? I don't remember. I simply don't remember. But if the chart says that, I'll go along with the chart.

Q: Major W. D. Pritchard. On July 10th in the Alamogordo newspaper, there's an article where it shows, it doesn't say when this was taken, but it says a Major Pritchard and his balloon group are demonstrating to reporters what these balloons and the various radar reflectors look like. Now Charlie Moore took a look at that and he said, "I don't recall there being any other balloon group in New Mexico or in that area at the same time we were there."

A: I think Charlie's right. I don't recall any either.

Q: So we were trying to figure out whether Major Pritchard was maybe a counter-intelligence type person or maybe he was there reviewing the security procedures, or maybe he was there for the promulgating, the cover story of weather balloon and weather research, so that Mogul would not come out in the open. Because the article in the paper talks about the use of reflectors for tracking purposes, the radar reflectors for tracking purposes, but never comes out talking about Mogul and the instrumentation that you all were using for nuclear detection or the tests that were being conducted.

A: Could Major Pritchard have been attached to or some way connected with the base weather station at Alamogordo?

Q: Well, sir, we don't know, but he is identified in that newspaper article as being a public information officer. When we traced that name back to your organization, we thought he may have been essentially undercover himself. We don't know that it's the same person, even though it's the same name.

A: I'm afraid that I can't offer any positive knowledge here.

Q: Were you associated with any counter-intelligence people in Watson Labs or...

A: Not to my knowledge. If some were around, they were spoofing me because I didn't know it.

Q: Were there any other types of intelligence persons on your staff or the staff of Watson Laboratories?

A: Not to my knowledge.

Q: So the only people you had were actually civilian researchers...

A: And a few military officers, yes.

Q: Signal Corps and Army Air Force?

A: All the officers that I had on my staff were all Air Force. No Signal Corps at all.

Q: A couple more names that came off that news article where they're displaying the balloon launch. It's Major W. D. Pritchard, Major C. W. Manglin, Lieutenant Siegal, and a Captain L. H. Divack.

A: None of those names are in my memory, firm in my memory at all.

Q: You were aware of the previous Colonel Duffy's predecessor, Major Crane...

A: I never met Richard Crane. I knew him only by the path of debris that he left behind. I never met him.

Q: When you took over, was there any worry about security on the project? That it was possibly a problem, there was a problem or there could be a potential problem that may warrant scrutiny by Air Force intelligence or security people?

A: We were aware of the delicacy of security on the project, and the reason was obvious. You could not conduct field operations of the size that we had without somebody asking questions. Anybody with a pair of 8x50 binoculars on the side of the mountain could look down and see what was going on and that, of course, would prompt questions, and we were aware of that, and didn't really know what to do about it except to go on doing our job and taking care of things as they occurred. But we were aware of the sensitivity and of the weakness of security in the Project Mogul. Not from the people in it, disclosure by the people, but simply the obvious activity that could be observed.

You can't fill a balloon that's give or take 60 feet high, without somebody seeing it.

Q: When you were at Alamagordo and some of the various balloons were being launched, what was the largest array that you saw out there?

A: You mean payload?

Q: No, the entire assembly. The balloons, payloads, reflectors...

A: I didn't observe any of the reflectors, and if I did, they were so common place that it wouldn't have stuck in my memory. The neoprene balloons bearing reflectors were just common occurrences. I wouldn't have lodged any of those observations in memory because they were just too common.

Q: Charlie Moore had indicated that some of the balloons they tried during the early experiments were relatively new types of reflectors that probably had never been used in New Mexico before, the M307B model. And that Ed Istvan had gone to several, essentially toy manufacturers, to try to get some of these reflectors made.

A: That's correct. I don't know that Ed Istvan... Ed Istvan got out of line. He may have told you this, and I don't mean to tell tales about Ed, but Ed was a very... Indeed, every man on Colonel Duffy's staff was very energetic. It was the Signal Corps' responsibility to procure those targets. Not ours and Colonel Duffy's office. However, to accelerate the activity of the Signal Corps and spur them on to action, our Air Force officers in Colonel Duffy's office, were literally on the backs of the Signal Corps people who did the job, and oftentimes did things that they shouldn't have done and were out of channel, so to speak. It was on such an occasion that Ed Istvan acted to line up contractors for these targets. He got into a considerable amount of, shall we say, controversy with the Signal Corps because he was out of line.

Q: Do you recall any of the contractors he may have worked with?

A: No, I don't remember them by name. They were not within my purview at the time. As I have told others, including Mr. Pflock, we had an outstanding expeditor on our staff, on Colonel Duffy's staff, by the name of John E. Peterson. Jack Peterson was a major at the time. He was a pre-war graduate of Harvard Business School, and he knew business operations inside and out. Again, he was an extremely energetic fellow. He was very, very valuable and successful at breaking loose stuck contracts and stuck production and things that weren't moving as fast as they should. During the war that was very important.

Jack monitored the procurement of these radar targets, and I believe Ed Istvan either worked for or alongside of Jack Peterson, and I remember when they finally... Now this was all not under my purview, but I worked in the same building with them, and I knew Jack very well, he was a very good friend and we talked and joked with each other a lot. I remember so clearly when the contractor for these targets was selected and Jack thought it was the biggest joke in the world that they had to go to a toy manufacturer to make these radar targets. Then it was

even a bigger joke when it turned out that because of wartime scarcities of materials, the tape that they used to assemble these targets, the reflecting material on the balsa frames was some kind of a pinkish purple tape with hearts and flowers designs on it. This was, again, a big flap.

Q: Did you ever see any of those?

A: Yeah, I saw some of them. Not in connection with my work, but they were around the office. The prototypes were around the office and the first production runs were there.

Q: So you would say it's a limited number of a few runs maybe.

A: I have no idea how many hundreds were made, or even thousands. But like everything else that goes into production, they have a limited production to begin with until they work out the bugs, and then they go full blower in the high production.

Q: Do you remember a rough span of times that you remember seeing these? When you saw the first one and when you saw the last one?

A: It was probably 1944 or 1945. It was probably late in 1944 when the first ones were produced.

Q: Where did you see those? What part of the country?

A: Right there at Signal Corps. We were all working at that time, and John Peterson had his offices in a location called the Toms River Signal Laboratory, which was actually located on the jurisdictional lines between Siegart and Spring Lake, New Jersey. It was an old night club that the Signal Corps had rented for the purposes of doing remote experimentation.

Q: The Siegart Inn?

A: Exactly. That's where John had his office, and I was there for a time doing work on developing the operational procedures of the SCR-658, the radio direction of wind, meteorological data. Rawin sonde I did most all the work on developing how to use that instrument, and it was done there at the Siegart Inn.

Q: Do you recall any other physical attributes about the radar reflectors, the balsa wood? Charlie Moore had indicated that the material had been coated in something like Elmer's glue which made it much more durable. Do you recall anything like that?

A: No, I don't. I didn't concern myself with that except as an observation to the side. The radar targets were geometrically elementary. They were three intersecting planes -- X, Y, and Z. The geometry of them was such, as you well know, that any incident wave would be reflected exactly, precisely, in the direction from which it came. So they were simple. I don't recall any of the details of how they were made or what materials were used or the coatings or anything. At the time it wasn't within my range of job.

Q: Did Colonel Duffy inform you officially? When he said he called you, was this like an official...

A: No. It was just an informative call. There wasn't any official transmission of knowledge nor expected action to result from it.

Q: Did Colonel Duffy consider this to be some sort of security violation?

A: No. Not to my knowledge, no. It's part of doing business.

Q: So he wasn't particularly upset, and he didn't require a formal explanation.

A: No.

Q: So that's the first you were aware, when he called you. None of your technicians had mentioned it to you?

A: No. Not to my knowledge.

Q: Did you have any interaction with the people at 8th Air Force such as General Ramey or anyone else who may have been at Roswell Army Air Field?

A: No. I don't recall any interaction with them, no.

Q: What about Dr. Crary or Dr. Peoples? Do you know if they had interaction with those folks?

A: I don't recall any, no.

Q: At some point in Project Mogul did you utilize equipment based at Roswell Army Air Field?

A: No, we had our own aircraft based at Fort Dix, New Jersey.

Q: Did you ever have a rawinson receiver at Roswell?

A: Not to my memory. No. We may have, but the specifics on that, I don't recall.

Q: Can you think of any reason why Dr. Peoples would meet with one of the bomb squadron commanders at Roswell in September of 1947?

A: Probably to arrange air drops of bombs as signal sources for testing the Mogul sound receivers. We had a fellow that was assigned to the electronics test squadron at Fort Dix by the name of Duff, Eugene Duff, who was an ordnance expert and he may have been involved in arranging bomb drops which would have been exploded in air as a sound signal source for the purpose of testing the Mogul receivers.

Q: Did you also procure aircraft from Middletown, Pennsylvania?

A: Yes. I believe our electronic squadron was moved from Fort Dix to Middletown. To Olmstead Air Force Base. When that was, I can't exactly pinpoint, but it was probably some time in 1947. Gene Duff, our ordnance man, was a part of that group. I don't know whether Gene Duff still lives or not, but he is a name that you might look into. Eugene Duff.

Q: Has anyone asked you to explain what happened at Roswell? In your opinion, what happened?

A: Until these recent inquiries, I don't recall anyone asking me to explain. I don't recall it ever coming up for me to answer in connection with the Mogul tests. I don't recall that. You know, things happen every day, and you treat crises from moment to moment as though they were so much cord wood. They aren't all worthy of memory. But I don't recall it.

Q: Other than our conversation here today, has anyone ever discussed with you not talking about Mogul? It's essentially declassified, it is no longer a classified project, but has anyone in the government -- the Air Force, the Army, Department of Energy or anyone else, ever said don't discuss this?

A: Absolutely not. No such thing.

Q: What we're trying to do is make sure we are open to the General Accounting Office and to the American public in general when we publish our reports. So all the people that we've discussed this with, we want to make absolutely sure that someone has not come to them and said you're going to get in the cover story, because we want this to be as open as possible and get this thing resolved once and for all. There are going to be those, as you stated, the true believers, who may not accept what

we have to say, but we just want to try to get everything out in the open.

A: It's about 45 years since all of this happened. Even at the time, as I mentioned a moment ago, one gets very busy in a project of this sort and you treat rather large events as they come, and you give them action and then you go on to the next one. All of them don't stay in memory.

Q: We understand that you've been contacted by various people such as Mr. Pflock and Mr. Todd and we do appreciate you spending some time with us in this endeavor. We think it's very valuable for those people who were actually on the scene to provide their accounts of what actually occurred. It is valuable to us and we do appreciate that.

A: I wish I could be of more help on this thing. Apparently, things like this die very hard. (Laughter)

Q: Did you ever hear of any intelligence people getting involved in this thing? Colonel Duffy mentioned that some of the people at AMC maybe wanted...

A: No, I don't. Certainly no intelligence people... Certainly I was not involved with any intelligence people in this matter. If I was, I don't recall it. Colonel Duffy and the group at Wright Field protected me greatly, and I know that. They never said that, but I know they did because they left me free to do the project. And anything that would interfere with getting that project done as quickly as could be done, they would try to steer it away from me. I know they did that. Again, they never said that, but the action was obvious.

(Pause)

A: ...I was assigned for about two months to AFOC-1. Then Colonel Benjamin Holtzman, later General Holtzman, pulled me out of AFOC-1 and sent me to Baltimore because the Air Research and Development Command had just been organized, and I arrived on the scene while they were still trying to find chairs and desks. We worked in the old Sun Newspaper building in downtown Baltimore.

Q: They had intelligence personnel there, didn't they

A: They may have. I'm not aware of that. Then after I left the headquarters of ARBC in Baltimore, I spent four years at the Air Force Research and Development Command Office in Brussels, Belgium. Following that, I spent over three years on the Air Staff in the Pentagon.

Q: What year did you retire?

A: On my birthday in 1963. I then went into industry, and I worked for EG&G, a high technology company based near Boston, and I became a Vice President of one of their subsidiaries. I became the project manager and developer of the National Space Science Data Center at Goddard, in Greenbelt. I built that and set it up.

Then when the EPA, the Environmental Protection Agency, was formed in December of 1970, I was invited to join the newly formed EPA, and I did. I accepted the position. I went into the EPA as a Deputy Assistant Administrator in the Office of Research and Development. Then in 1973 and 1974 I was made Assistant Administrator for Research and Development in the EPA, the position from which I retired in 1982.

Q: Then did you have interaction with Spilhaus in your civil service career?

A: No. Oh, I met with him. Spilly was a consultant, and he even in his advancing age he was still an enormous source of ideas. If you brought him into a meeting as a consultant, surely somewhere along the line he would offer an idea that was useful. So he found a lot of contact throughout many organizations, particularly in those related to geophysics. Meteorology, geology; I know he worked with the U.S. Geological Survey, a very, very fine organization, and with NOAA. Those are two that I know he continued relationships with. But I had very little contact with him.

Spilly was a very intimidating character. I lived with him for awhile.

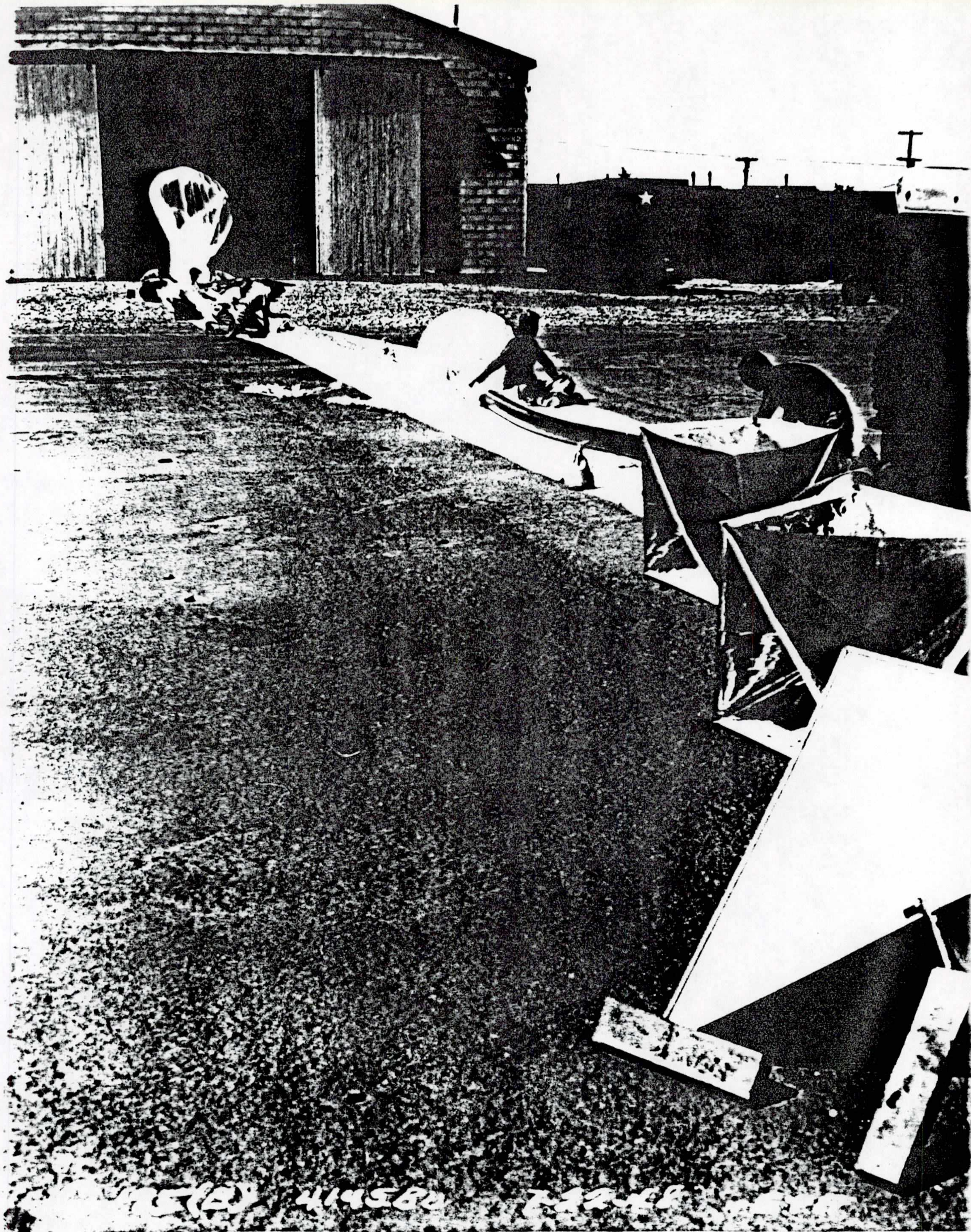
Q: Were you involved in his exploits in North Africa, out there in the desert with him?

A: No. Nor in China.

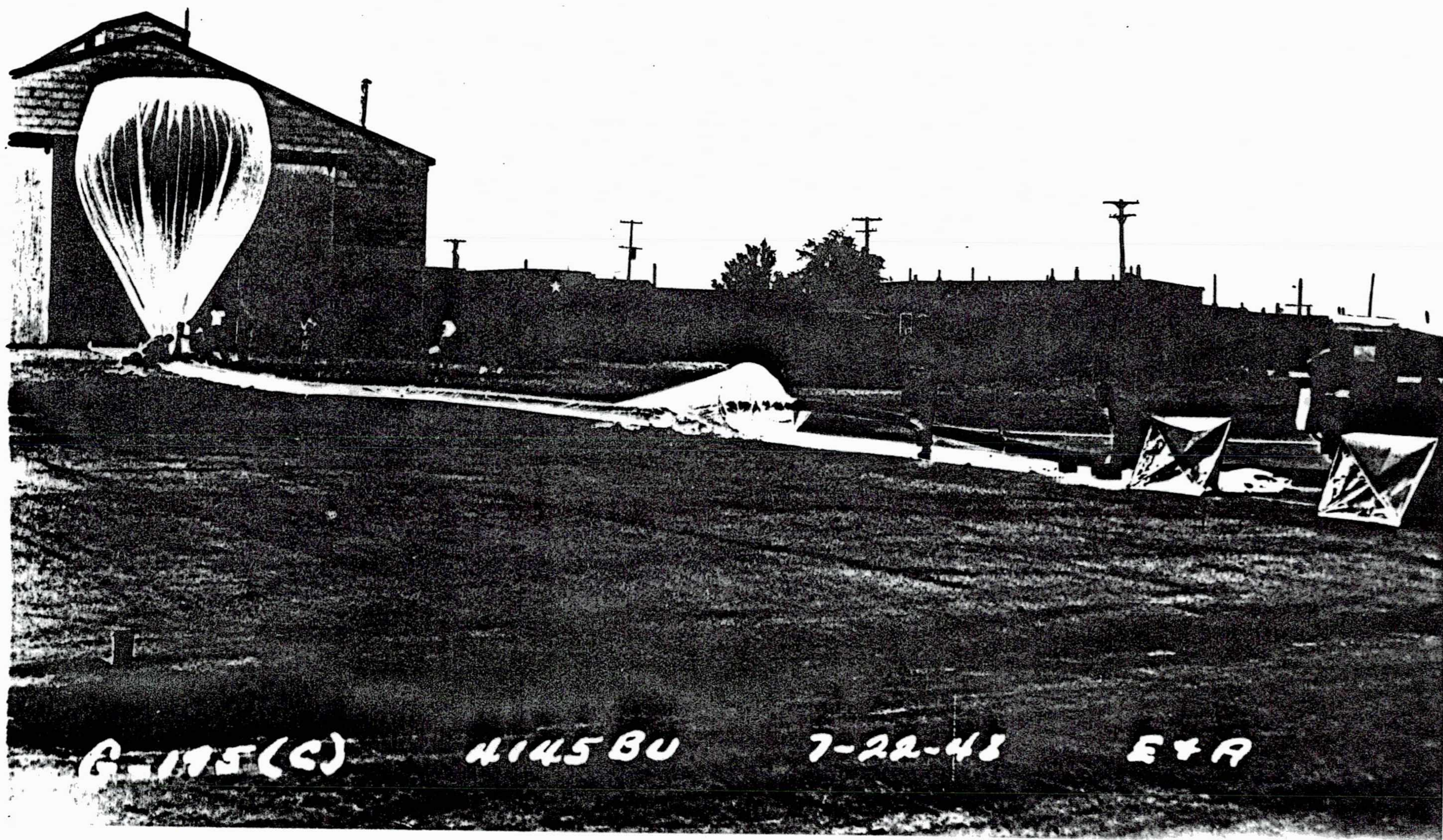
Q: He had quite some stories about some of his past exploits.

A: No matter where he went, he gathered stories.

(END)



414580 7-12-48



G-175(C)

4145BU

7-22-48

EYA

Log Summary
NYU Constant Level
Balloon Flights

TABLE VII
SUMMARY OF NYU CONSTANT-LEVEL BALLOON FLIGHTS

FLIGHT NUMBER	DATE AND RELEASE TIME	LAUNCHING SITE	DESCRIPTION OF BALLOONS	BALLOON WEIGHT	DESCRIPTION OF EQUIPMENT	TOTAL WEIGHT ON BALLOON INCLUDING BALLAST	DESCRIPTION OF ALTITUDE CONTROL	BALLAST WEIGHT	FREE LIFT	BALLOON LIFT	RADIOSONDE RECEPTION %	TRACKING %	AIRCRAFT OBSERVATION %	FLIGHT DURATION	O. TIME CONSTANT	MAXIMUM CONSTANT LEVELS MSL	RECOVERY & LANDING SITE	CRITIQUE
A	20 Nov. 1946 1438 EST	NYU, N.Y.	2 - 350 gram meteorological	0.7 kg	72.2 mc Radiosonde	1.8 kg	None	0	Not known	Not known	80%	0%	0%	70 min.	4 min. $\pm$ 1000'	Max. 37000' Const. 37000'	0%	Balloon balancing load. Free lift from 350 gram meteorological balloons. Successful cutting free of lifter balloons. Balloon did not level.
B	16 Dec. 1946 1219 EST	NYU, N.Y.	2 - 350 gram meteorological	0.7 kg	72.2 mc Radiosonde	1.8 kg	None	0	Not known	Not known	80%	Theodolite 50%	0%	31 min.	6 min. $\pm$ 1000'	Max. 15000' Const. 15000'	0%	Balloon balancing load. Free lift from 350 gram meteorological balloons. Successful cutting free of lifter balloons. Balloon did not level.
1	3 April 1947 1412 MST	Bethlehem Pennsylvania	14 - 350 gram meteorological balloons. Long cosmic ray train	4.9 kg	72.2 mc Radiosonde Sand ballast	13.0 kg	3 cans of ballast to be dropped on descent	6.8 kg	Not known	Not known	60% with recorder 50% without recorder	Theodolite 66%	0%	115 min.	None	Max. 46000' Const. 46000'	0%	Failure due to poor rigging, poor launching technique. 2 lifter balloons, 12 main balloons. Train rose and some balloons burst then descent rapidly.
5	5 June 1947 1317 MST	Alamogordo New Mexico	29 - 350 gram meteorological balloons. Long cosmic ray train	10.2 kg	72.2 mc Radiosonde Data gear Sand ballast Liquid ballast	26.4 kg	Balloons to cut off above 40000' 5 kg sand and 5 kg liquid to fall under 32000'	10.0 kg	9.9 kg	36.3 kg	100% without recorder	Theodolite 90%	90% B-17	343 min.	38 min. $\pm$ 200'	Max. 58000' Const. 51000'	100% E. of Roswell N. M.	First successful flight carrying heavy load. 3 lifter balloons, 26 main balloons.
6	7 June 1947 0509 MST	Alamogordo New Mexico	28 - 350 gram meteorological balloons. Long cosmic ray train	9.8 kg	74.5 mc Radiosonde. 69.3 mc transmitter. Ballast assembly	28.3 kg	Balloons to cut off above 40000' 5 kg sand and 5 kg liquid to fall under 32000'	10 kg	1.9	30.2 kg	95% without recorder	Theodolite 90%	40% B-17	166 min.	None	Max. 72000' Const. 72000'	50%	Flight unsuccessful. Altitude control damaged on launching. 4 lifter balloons, 24 main balloons.
7	2 July 1947 0521 MST	Alamogordo New Mexico	20 - 350 gram meteorological balloons in 2 Helios clusters	7.0 kg	74.5 mc Radiosonde Ballast assembly	25.7 kg	4 over inflated balloons. 10 kg lead shot to fall under 34000'	10 kg	10.5 kg	36.2 kg	60% without recorder	Theodolite 100%	100% C-54	412 min.	147 min. $\pm$ 5000'	Max. 48500' Const. 35000'	1% (1 balloon) neck	Best flight thought possible with flabby neoprene balloons. 4 lifter balloons, 16 main balloons.
8	3 July 1947 0303 MST	Alamogordo New Mexico	10 General Mills 7' .001" polyethylene	4.6 kg	74.5 mc Radiosonde Ballast assembly	16.7 kg	Dribbler, compass fluid Fixed leak 160 gm/hr	3 kg	3.5 kg	20.2 kg	100% with recorder	Theodolite 33% Radar - last 55%	Last 15% C-45	195 min.	62 min. $\pm$ 1500'	Max. 18500' Const. 18000'	0%	First non-extensible balloon flight. Due to lack of information on vent the altitude control was not active. However, flight shows excellent ability of non-extensible balloons. Loss of lift due to balloon leak 1000 gm/hr.
10	5 July 1947 0501 MST	Alamogordo New Mexico	1 M.A. Smith 15' .008" polyethylene	14.2 kg	74.5 mc Radiosonde Ballast assembly	16.3 kg	Dribbler Compass fluid	3 kg	5.6 kg	21.9 kg	512 min. with recorder	Theodolite 82 min.	0%	Over 512 min.	130 min. $\pm$ 300' 282 min. $\pm$ 2700'	Max. 15100' Const. 9000'	0%	Successful flight with altitude control working. Balloon reported Albuquerque after 11 hours; Rushed Colorado after 26 hours. Fluctuated toward end of transmission believed due to convection currents over Balloon diffusion 10 gm/hr.

27 MAY 94

MFR

SUBJECT: OTHER CONTACTS ON BALLOON ACTIVITY OR AVIATION
MISHAPS THAT MAY BE RELATED TO THE "ROSWELL INCIDENT"

The following organizations and individuals have been contacted during the period 23-27 May, concerning information on balloon activity and types of balloons being used for various purposes in New Mexico during 1947.

a) US Army Signal Corps Museum, Ft Gordon GA
Mr Ted Wise, Director, DSN 780-2818

"no actual balloons but will take a look for photographs, or descriptions,
etc. ref Mogul"

Ms Carol Stokes, Historian

b) US Army Communications and Electronics Command Museum, Ft Monmouth NJ
Ms Mindy Rosewitz, Curator, DSN 992-2440

"no examples or photos of balloons but did find a mechanical drawing (9
Jun 44) for an Air Pilot Balloon radar reflector" for which a copy was provided
Mr Richard Bingham, Command Historian, DSN 992-1675
Ms Ruth Fiornarto DSN 992-5781

c) Westinghouse Electronics History Museum, Baltimore MD
Mr Robert Dwitzbe, President

"no balloon activity or balloon-borne electronics packages in the 1940's;
Westinghouse became involved in balloon "TCOM" and derigibles in the
50's and 60's; we have no reference to Project MOGUL"

Ms Betsy xxxxxxxxxx

d) Sperry Hagley Museum

Ms Gail Dietrzyk, Curator, (304) 658-2400 ext 330

no contact as of 31 May--no information as to the manufacturer of the instrument
packages associated with MOGUL

e) AF/SE

Lt Col Lineberger, 3-7280

AAZ requested information related to B-29 and or B-50 accidents in New
Mexico in 1947 and 1948--response: B-29 crashed on T/O from Albuquerque in
Jan 1947 and a B-29 crashed on T/O from Walker AAF (Roswell) in Aug 1948;
both had multiple fatalities; no refueling mishaps between B-29 and B-50 in
1947/48

On 26 May AAZ requested information on all B-29 mishaps in the "New
Mexico" area (ie, NM and surrounding states) for the period 1947-50; information
o include specific date, crash location and number of fatalities: Lt Col Lineberger
were on microfilm, that all mishaps were filed chronological and that there were
7,000 mishap files; a manual review will take at least 60 days; I requested an
update in two weeks and a followup after the first year's entries had been reviewed

f) Smithsonian Air and Space Museum 20 May 94

Mr Tom Crouch, Aeronautics Curator, (202) 357-2515/3133

"no examples of 1947 vintage balloons; have photographs but are taken at
such a distance that no details of the balloon construction are evident; recommend

contacting Mr James Rand (Jim) of Winzen Balloons, Souix Falls, SD; Jim Rand is the President and his office is at 12061 Network Blvd, Suite 200, San Antonio TX 78249 (512) 690-3400

Requested Lt Col Hachida at AIA to attempt to contact Mr Rand and determine if he had any information relative to the construction of these early balloons

g) Center for Military History, 14th St NW Washington DC
Dr Bennett, Curator
Dr Drea

Ms Hannah Zeidlik, Archivist (202) 504-5416

"no records of Project Mogul; recommend checking with DOE historian or the US Army Military Institute"

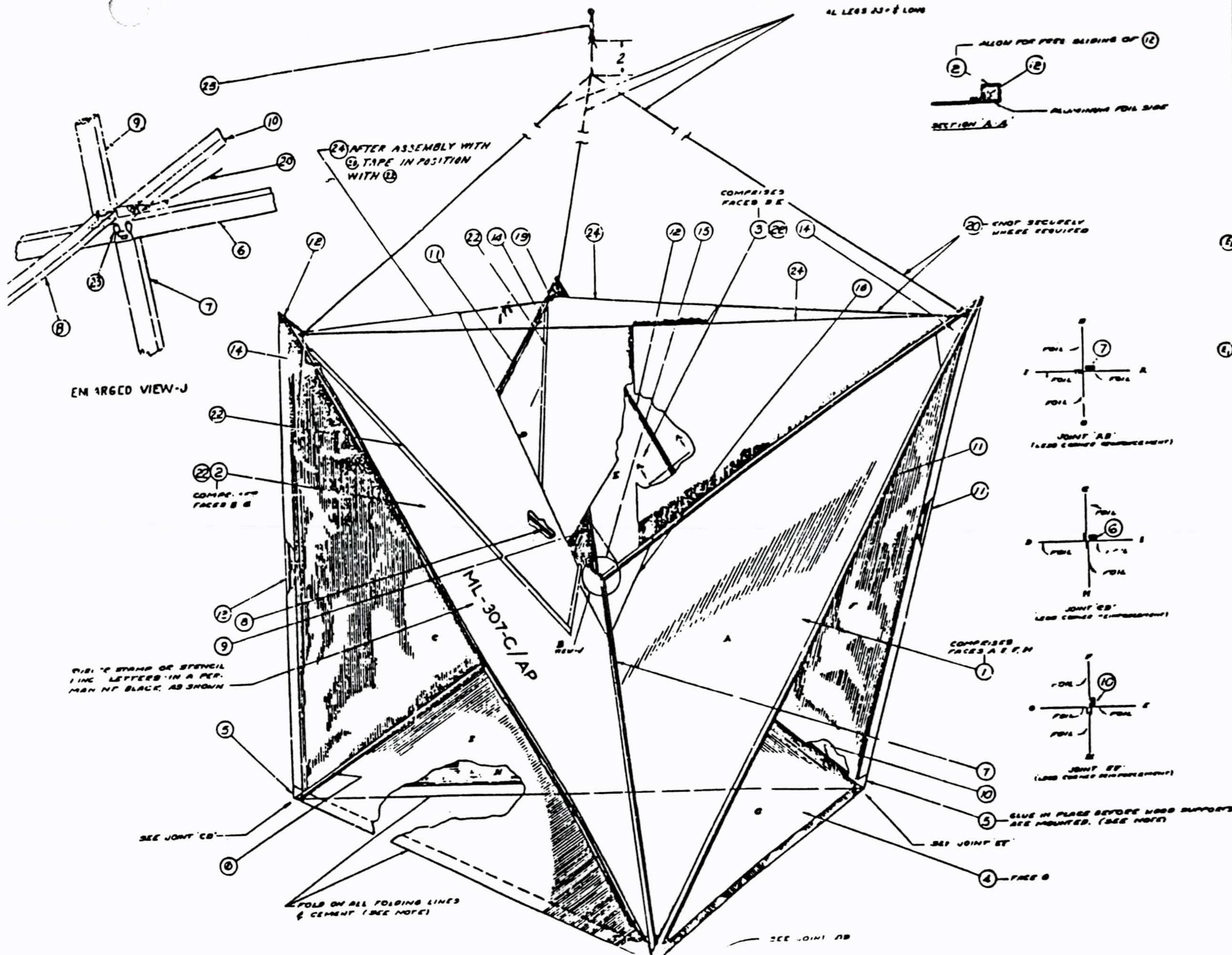
h) Dr Benjamin Coolling, DOE Historian (301) 903-5431
Dr Marie Hallion (202) 586-5238 @ Forrestal Bldg

"the AEC collection from the 1947-late 50's era has been transferred to NARA; might check the 'Military Liaison Committee' (MLC), the military organization associated with AEC during that time; recommend discussing this with the AEC POC at NARA, Mr Jimmy Rush (301) 713-7250; check to see if there are any references to AEC people/correspondence with the MLC

i) US Army Military History Institute, Carlisle Barracks PA
Mr John Slonacker, Curator DSN 242-3611

Jeffrey C Butler, Col, USAF

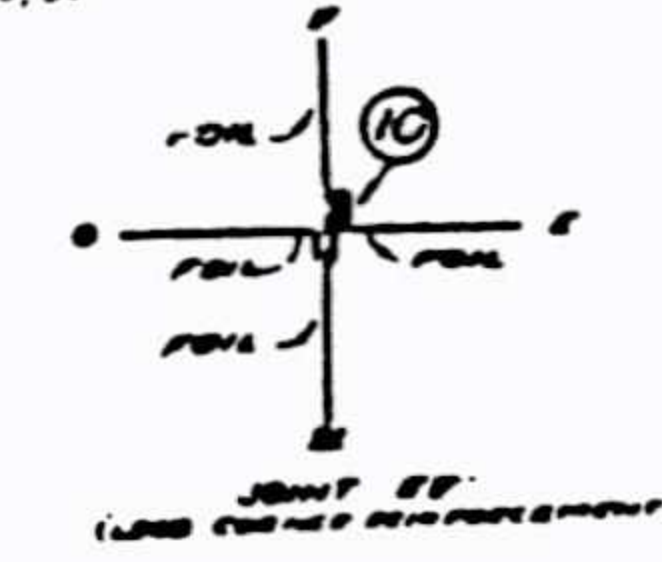
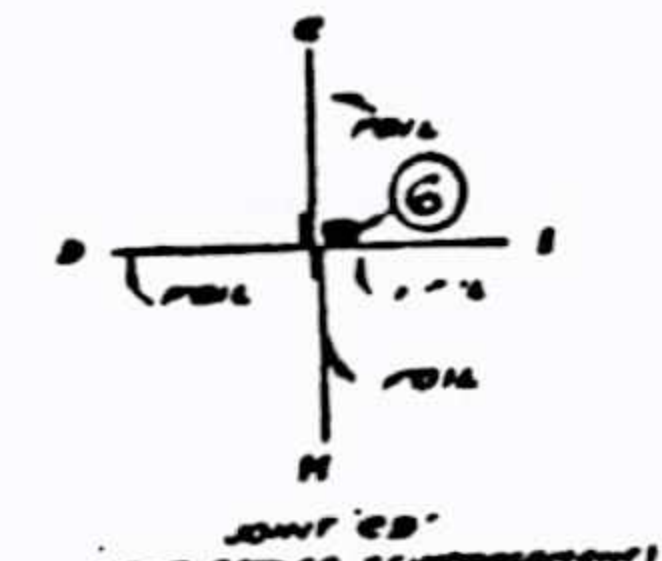
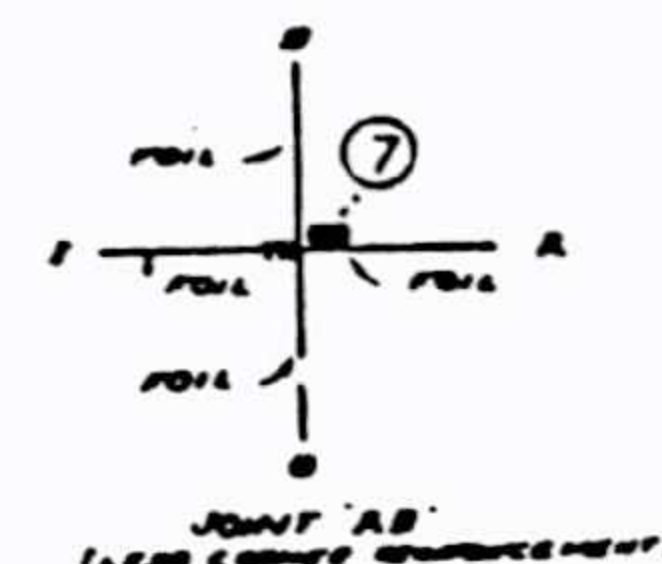
Copy of Blueprint for
“Pilot Balloon Target”
ML-307C/AP Assembly



AL LESS 23-8 LOW

ALLOW FOR FREE SLIDING OF (12)

SECTION A-B



GLUE IN PLACE BEFORE WOOD SUPPORTS ARE MOUNTED. (SEE NOTE)

SEE JOINT ET

SEE JOINT AB

REV	DESCRIPTION	DATE
1	REVISED DRAWING - IN TITLE "ML-307C/AP"	10/1/50
2	REVISION (1) & (2) DELETED. (3) ADDED. (4) & (5) ADDED.	10/1/50
3	REVISION (1) & (2) DELETED. (3) ADDED. (4) & (5) ADDED.	10/1/50
4	REVISION (1) & (2) DELETED. (3) ADDED. (4) & (5) ADDED.	10/1/50
5	REVISION (1) & (2) DELETED. (3) ADDED. (4) & (5) ADDED.	10/1/50

- (1) SHALL BE CYCLOPS-BONE OR MORE OVER-EXPOSED N. OF EQUATOR.
- (2) SHALL BE TYPE I, CLASS I, PER SPEC CEC.
- (3) SHALL BE "BONDED PLUM" AS MADE BY WFO CO., NEW YORK, N.Y., OR EQUAL.
- (4) SHALL BE SCOTCH ACETATE FILM TYPE MADE BY MINNEAPOLIS MINING & MFG CO. MINN. OR EQUAL.
- (5) BOND ALL JOINTS SHOWN ON ASSEMBLY IN CEMENT, GENERAL PURPOSE, SYNTHETIC SPEC. MIL-C-4003.
- (6) SHALL BE TYPE "STAN-371" AS MADE BY SARGENT & Lundy CO., NEW YORK, N.Y., OR EQUAL.
- (7) SHALL BE "TRACEL" TYPE LUMES AS MADE BY ART. CO., NEWARK, N.J., OR EQUAL.
- (8) THERE SHALL BE NO FOIL-TO-FOIL JOINTS.
- (9) TOLERANCES FOR DIMENSIONS ON THIS DRAWING SHALL BE ±2 UNLESS OTHERWISE SPECIFIED AND SHALL BE SUCH THAT ALL PARTS OF THE ASSEMBLY WILL FIT TOGETHER IN A PROPER MANNER.

NO.	DESCRIPTION	QTY.	REMARKS
1	SWIVEL	23	
2	WIRE	23	
3	BRACKET	23	
4	ADHESIVE TAPE	23	SEE NOTE
5	WIRE PLUM	23	
6	CYCLOPS	23	
7	REINFORCEMENT	23	SEE NOTE
8	REINFORCEMENT	23	
9	REINFORCEMENT	23	
10	BRACE	23	
11	BRACE	23	
12	BRACE	23	
13	BRACE	23	
14	BRACE	23	
15	BRACE	23	
16	BRACE	23	
17	BRACE	23	
18	BRACE	23	
19	BRACE	23	
20	BRACE	23	
21	BRACE	23	
22	BRACE	23	
23	BRACE	23	

PILOT BALLOON TARGET ML-307C/AP ASSEMBLY

REV	DESCRIPTION	DATE
1	REVISED DRAWING - IN TITLE "ML-307C/AP"	10/1/50
2	REVISION (1) & (2) DELETED. (3) ADDED. (4) & (5) ADDED.	10/1/50
3	REVISION (1) & (2) DELETED. (3) ADDED. (4) & (5) ADDED.	10/1/50
4	REVISION (1) & (2) DELETED. (3) ADDED. (4) & (5) ADDED.	10/1/50
5	REVISION (1) & (2) DELETED. (3) ADDED. (4) & (5) ADDED.	10/1/50

Signed Sworn Statement
of Newton
July 21, 1994

STATEMENT OF SUSPECT/WITNESS/COMPLAINANT

(THIS FORM IS SUBJECT TO THE PRIVACY ACT OF 1974 - SEE REVERSE)

SUSPECT

XX

WITNESS/COMPLAINANT

SECTION I. STATEMENT INFORMATION

DATE 21 Jul 94	TIME 1630	LOCATION (Bldg/Room No.) AND INSTALLATION AFOSI Detachment 401 Randolph AFB TX	UNIT TAKING STATEMENT AFOSI Detachment 409	REPEAT (If Known) OFFENSE COMPLAINT
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SECTION II. PERSONAL IDENTIFICATION (Print or Type)

NAME (Last, First, Middle Initial) NEWTON, IRVING	SSN [REDACTED]	STATUS/GRADE USAF (RET) O-4
LOCAL ADDRESS (Include Zip Code) [REDACTED] TX [REDACTED]	DATE AND PLACE OF BIRTH (If Required) [REDACTED]	TELEPHONE HOME [REDACTED] DUTY:
PERMANENT ADDRESS OR HOME OF RECORD (Include Zip Code) Same as Above	MILITARY ORGANIZATION/EMPLOYER USAF Retired	DEROS N/A

SPONSOR INFORMATION (Name, Grade, SSN, Organization, Duty Phone)

N/A

SECTION III. ACKNOWLEDGEMENT OF OFFENSES AND 5TH AMENDMENT/ARTICLE 31 RIGHTS ADVISEMENT (Suspect Only)

1. I have been advised that I am suspected of the following offenses:

by _____ (Rank and Full Name) who identified himself/herself as a _____
(SP, special agent, etc.) and advised me that I have the following rights according to the 5th Amendment of the US Constitution/Article 31 of the
Uniform Code of Military Justice (suspect initials on line next to each statement).

- _____ a. I have the right to remain silent - that is to say nothing at all.
- _____ b. Any statement I make, oral or written, may be used as evidence against me in a trial or in other judicial, non-judicial, or administrative proceedings.
- _____ c. I have the right to consult with a lawyer.
- _____ d. I have the right to have a lawyer present during this interview.
- _____ e. I may obtain a civilian lawyer of my own choice at no expense to the government.
- _____ f. I may request a lawyer any time during this interview.
- _____ g. If I decide to answer questions with or without a lawyer present, I may stop the questioning at any time.
- _____ h. MILITARY ONLY: If I want a military lawyer, one will be appointed for me free of charge.
- _____ i. CIVILIANS ONLY: If I cannot afford a lawyer and want one, a lawyer will be appointed for me by civilian authorities.

2. I have read my rights as listed above and I fully understand my rights. No promises, threats, or inducements of any kind have been made to me. No pressure or coercion has been used against me. I make the following choice (suspect initials on line next to appropriate statement):

- _____ a. I do not want a lawyer. I am willing to answer questions or make a statement or both, about the offense(s) under investigation.
- _____ b. I do not want a lawyer and I do not wish to make a statement or answer any questions.
- _____ c. I want a lawyer. I will not make any statement or answer any questions until I talk to a lawyer.

3. I fully understand my rights and that my signature alone does not constitute an admission of guilt.

(Signature of Suspect)

(Signature of Witness/Interviewer)

PRIVACY ACT STATEMENT

AUTHORITY: 10 U.S.C. 8013, 44 U.S.C. 3101; and EO 9397

PRINCIPAL PURPOSES: Used to record information and details of criminal activity which may require investigative action by commanders, super security police, AFOSI special agents, etc. Used to provide information to the appropriate individuals within DOD organizations who ensure proper legal and administrative action is taken.

ROUTINE USES: Information may be disclosed to local, county, state and federal law enforcement or investigatory authorities for investigation possible criminal prosecution or civil court action. Information extracted from this form may be used in other related criminal and/or civil proceedings.

DISCLOSURE IS VOLUNTARY: SSN is used to positively identify the individual making the statement and as a conduit to check past criminal records.

SECTION IV. STATEMENT

THIS PAGE USED FOR SIGNATURE ONLY. TEXT OF STATEMENT BEGINS ON PAGE 3

[Handwritten signature]

SECTION V. SIGNATURE/OATH

"I hereby voluntarily and of my own free will make this statement without having been subjected to any coercion, unlawful influence, or unlawful inducement. I swear (or affirm) I have read this statement, initialed all pages and corrections, and it is true and correct to the best of my knowledge.

[Handwritten signature]
(Signature of Person Making Statement)

[Handwritten signature]
(Signature of Witness/Interviewer)

Subscribed and sworn to before me, a person authorized by law to administer oaths, this 21st day of July 19 94

[Handwritten signature]
(Signature of Person Administering Oath)

SECTION VI. INSTRUCTIONS FOR CONTINUATION PAGE(S)

Use plain bond paper (both sides optional). At the top right of each page, print or type: "(Last Name of Individual making the Statement) on (Date)". At the bottom of each page, print or type: "Page ___ of ___ Pages". The individual must initial the top and bottom entries and sign his/her name at the bottom of each page.

Ln. I was asked to provide this statement, by Lt. Col. Joseph V. Rogan who advised me, he was assisting in an investigation at the behest of the Secretary of the Air Force, for the GAO, to look into facts concerning what has become to be known as "The Roswell Incident". *Ln.*

Ln. As I recall it was July 1947, I was then a Warrant Officer with seven years service. I was the only weather forecaster on duty in the Fort Worth base weather and flight service center. The base weather covered only the base the flight service center covered most of the southwest states. I received a call from someone in General Ramey's office who asked that I go to the General's office. I informed him that I was the only forecaster on duty and could not leave. Several minutes later General Ramey Himself called and said "get your ass over here if you don't have a car take the first one with a key". *Ln.*

Ln. I was met at the General's office by a Lt Col or Col who told me that someone had found a flying saucer in New Mexico and they had it in the General's Office. And that a flight had been set up to send it to Wright Patterson AFB OH., but the General suspected that it might be meteorological equipment or something of that nature and wanted it examined by qualified meteorological personnel.

The Col and I walked into the General's office where this supposed flying saucer was lying all over the floor. As soon as I saw it, I giggled and asked if that was the flying saucer. I was told it was. *Ln.*

Ln. Several people were in the room when I went in, among them, General Ramey, a couple of press people, a Major, I learned to be Major Marcel and some other folks. Someone introduced Major Marcel as the person who found this material.

I told them that this was a balloon and a RAWIN target. I believed this because I had seen many of these before. They were normally launched by a special crew and followed by a ground radar unit. They provided a higher altitude winds aloft. We did not use them at Fort Worth. However, I was familiar with them because we used them and their products on various projects in which I was involved. These were used mostly on special projects and overseas. The balloon was made out of a rubber type expandable material and when launched was about six to eight feet across. When the balloons got to altitude they expanded to twenty feet or more. The target was used for radar reflections and I believe each leg of the target was approximately 48 inches. It resembled a child's Jack (like a child's ball and jacks set) with a metallic material between the legs. The legs were made of material appearing to be like balsa wood kite sticks but much tougher. *Ln.*

Ln. While I was examining the debris, Major Marcel was picking up pieces of the target sticks and trying to convince me that some notations on the sticks were alien writings. There were figures on the sticks lavender or pink in color, appeared to be weather faded markings with no rhyme or reason. He did not convince me these were alien writings. *Ln.*

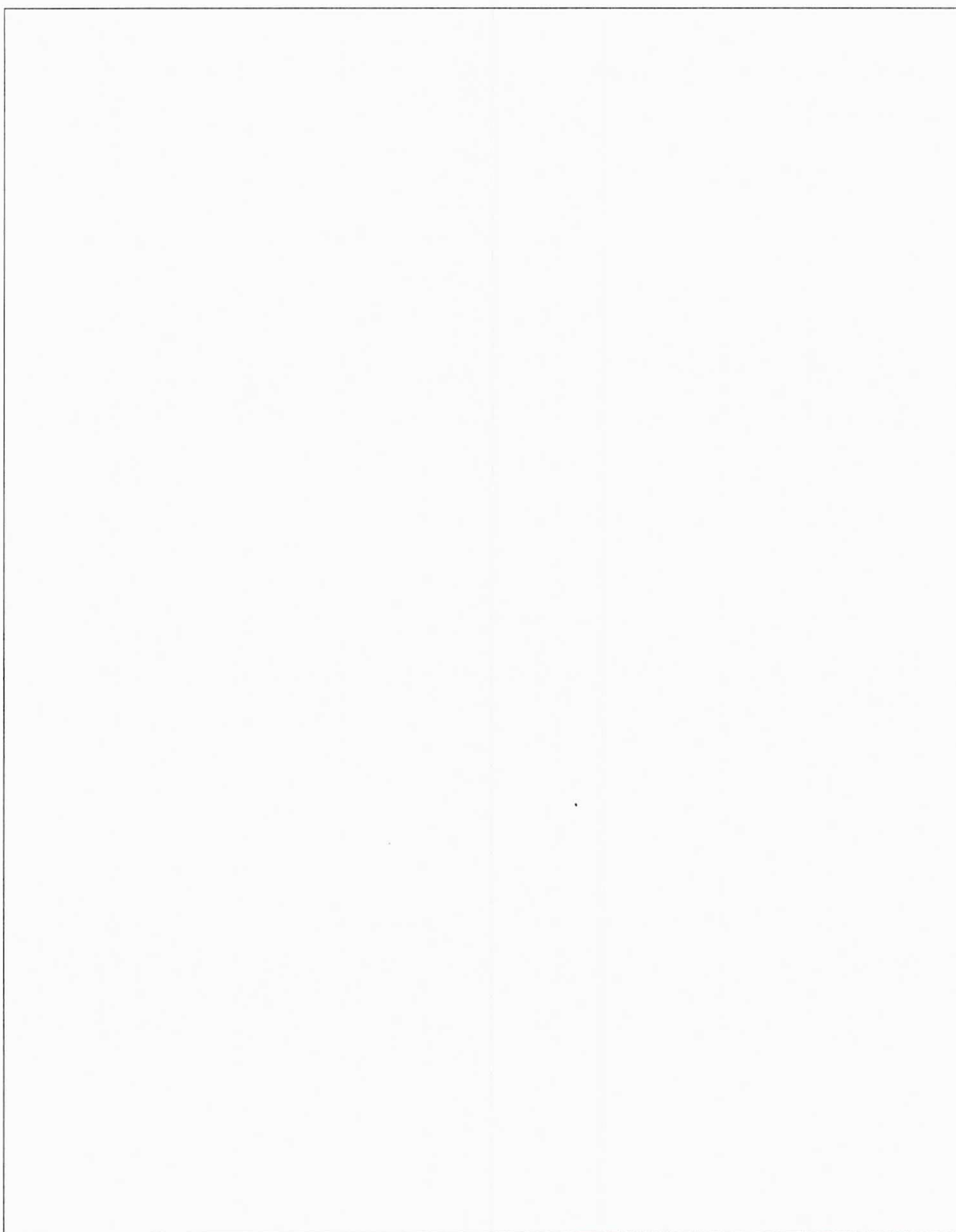
Ln. I was convinced at the time that this was a balloon with a RAWIN target and remain convinced. *Ln.*

Ln. I remember hearing the General tell someone to cancel the flight the flight to Wright Patterson. *Ln.*

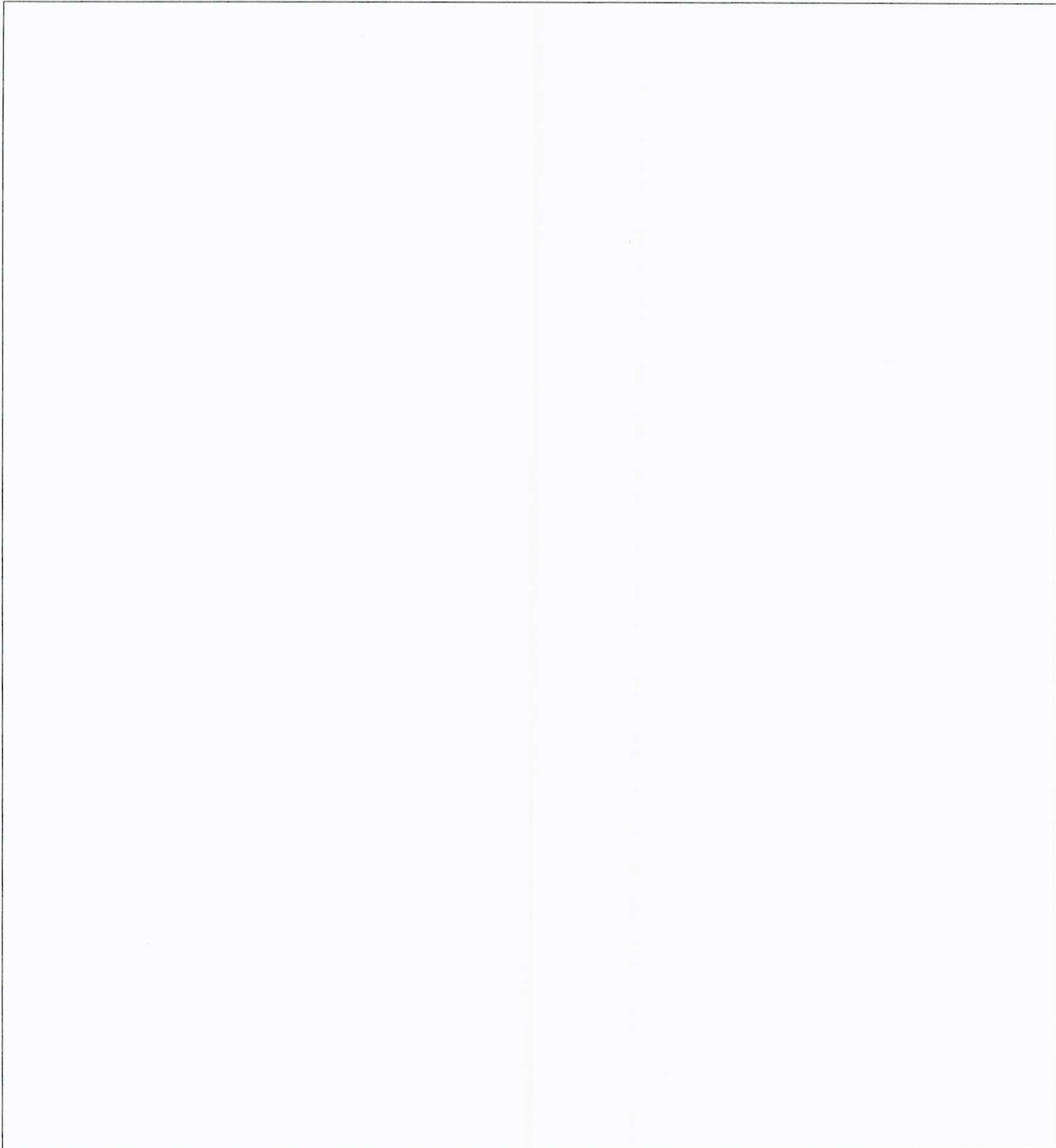
Ln. While in the office several pictures were taken of Major Marcel, General Ramey, myself and others. *Ln.*

Ln. I was dismissed and went to my office to resume my normal duties. *Ln.*

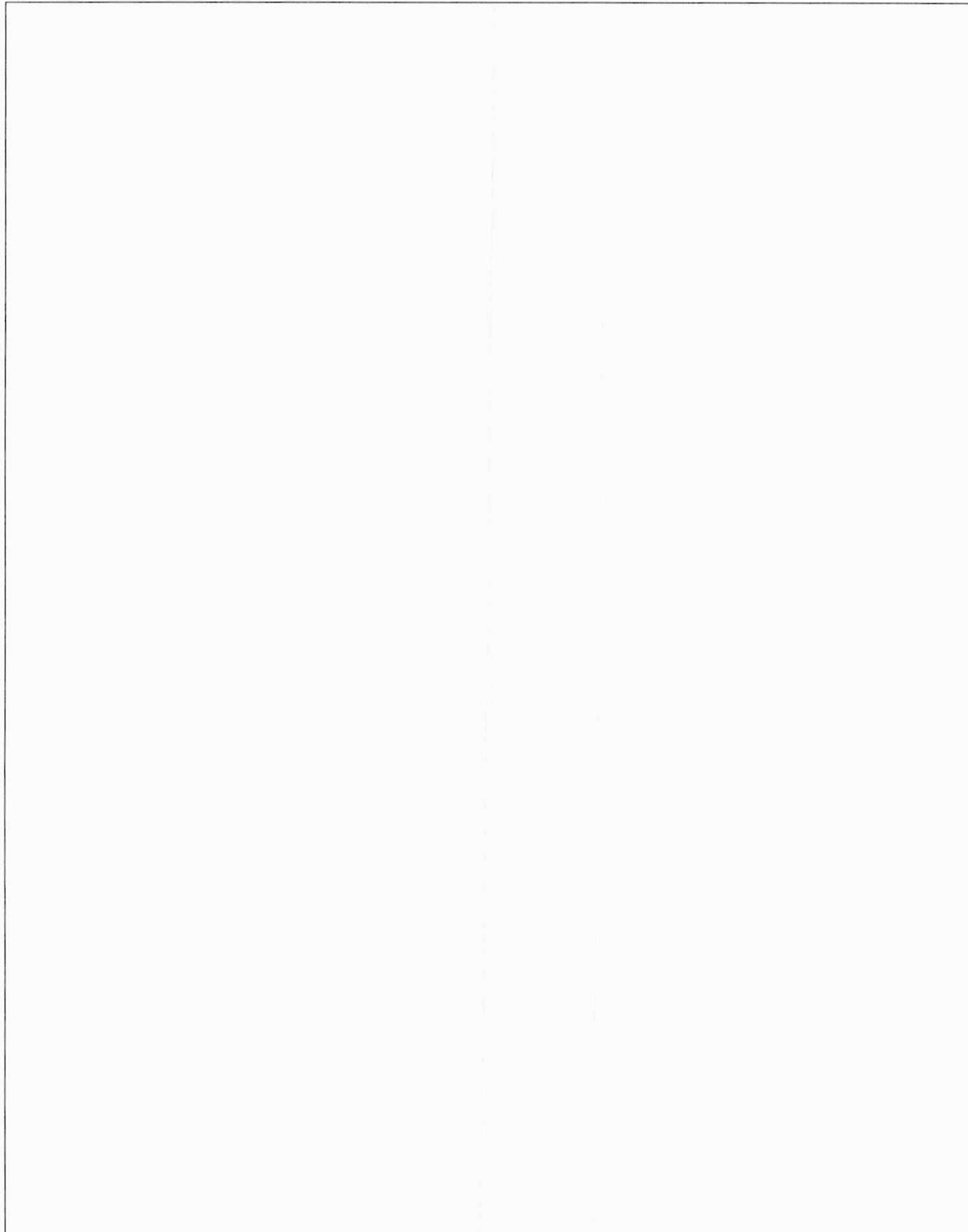
Ln. During the ensuing years I have been interviewed by many authors, I have been quoted and misquoted. The facts remain as indicated above. I was not influenced during the original interview, nor today, to provide anything but what I know to be true, that is, the material I saw in General Ramey's office was the remains of a balloon and a RAWIN target. *Ln.*



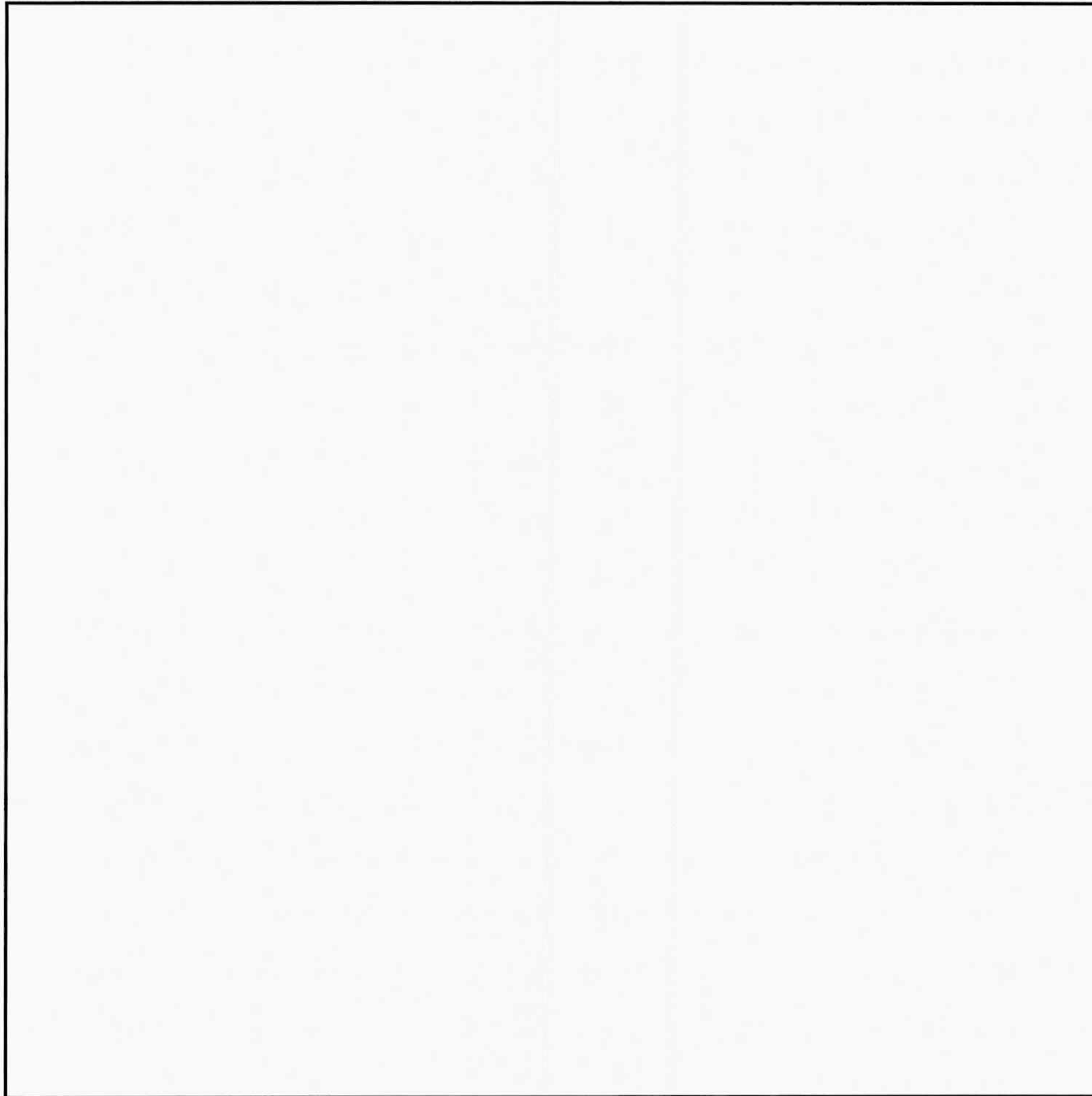
General Carl A. Spaatz, Commanding General, U.S. Army Air Forces, 1947. Gen Spaatz was the Chief of Staff, United States Air Force, 1947–1948. A review of his personal and official documents, including highly classified daily briefings for the summer of 1947, do not in any way suggest that U.S. Army Air Forces recovered a flying saucer or its alien occupants. *U.S. Air Force Photo.*



Lt. Gen. Hoyt S. Vandenberg, Deputy Commander, U.S. Army Air Forces, 1947. General Vandenberg served as Chief of Staff, United States Air Force 1947–1953. He is alleged to have directed the recovery of a flying saucer at Roswell Army Air Field on July 8, 1947. A review of his official daily activities calendar revealed that he was involved with a hoax involving a flying saucer recovery on July 7 in Texas. Records do not support the claim that he had any similar involvement on July 8, as charged by crashed saucer conspiracy theorists (*see Atch 15*). *U.S. Air Force Photo*.



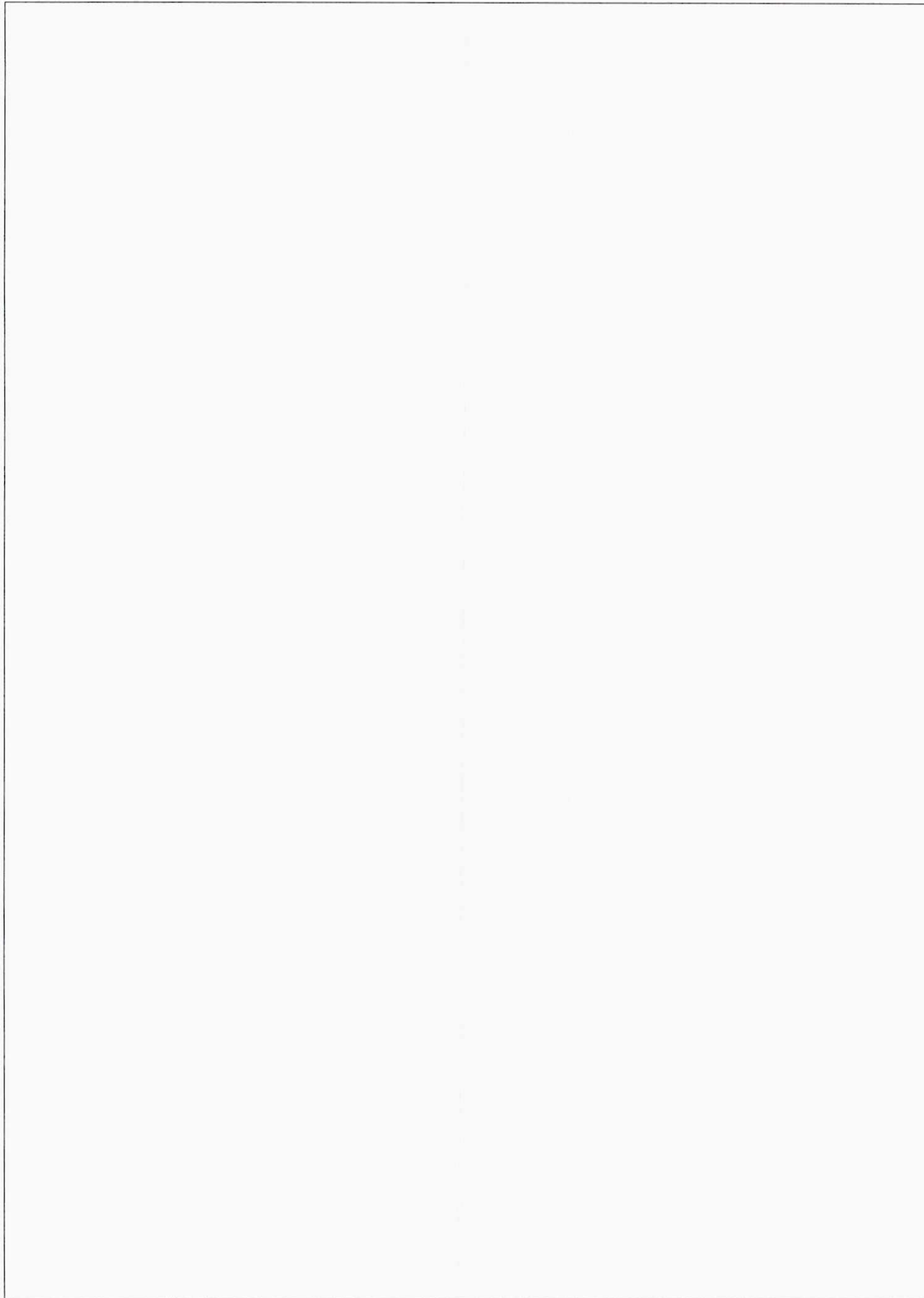
General Nathan F. Twining, Commanding General, Air Matériel Command, 1947. General Twining was Chief of Staff, United States Air Force, 1953–1957. UFO theorists allege that General Twining altered his plans unexpectedly in July 1947 to go to New Mexico to oversee the recovery of a flying saucer. However, records indicate that Twining went to New Mexico in July 1947, along with several other general officers, to attend the Nuclear Bomb Commanders Course. He received orders to attend this course more than a month *before* the alleged “incident” occurred (*see Atch 14*). *U.S. Air Force Photo.*



Maj. Gen. Curtis LeMay (*left*) and **Brig. Gen. Roger Ramey** are shown here while serving in Kharagpur, India, during World War II. *U.S. Air Force Photo.*

General Curtis E. LeMay was Deputy Chief of Air Staff for Research and Development, U.S. Army Air Forces, in 1947, and later Chief of Staff, United States Air Force, 1961–1965. As Deputy Chief of Air Staff for Research and Development, LeMay had a strong influence on the high-priority Project MOGUL (*see Apps 8 and 9*). He also maintained close associations throughout his career with former subordinates from World War II bombing campaigns, including Brig. Gen. Roger M. Ramey and Col. William H. Blanchard.

Brig. Gen. Roger M. Ramey was the Commanding General, Eighth Air Force, in 1947. He is alleged to have participated in the cover-up of the recovery of an extraterrestrial vehicle by substituting debris from an ordinary weather balloon for that of an alien spacecraft. In fact, General Ramey displayed the original debris recovered from the ranch, which came from a MOGUL balloon train. Ramey withheld only the components that would have compromised the highly sensitive project (*see Atch 16*).

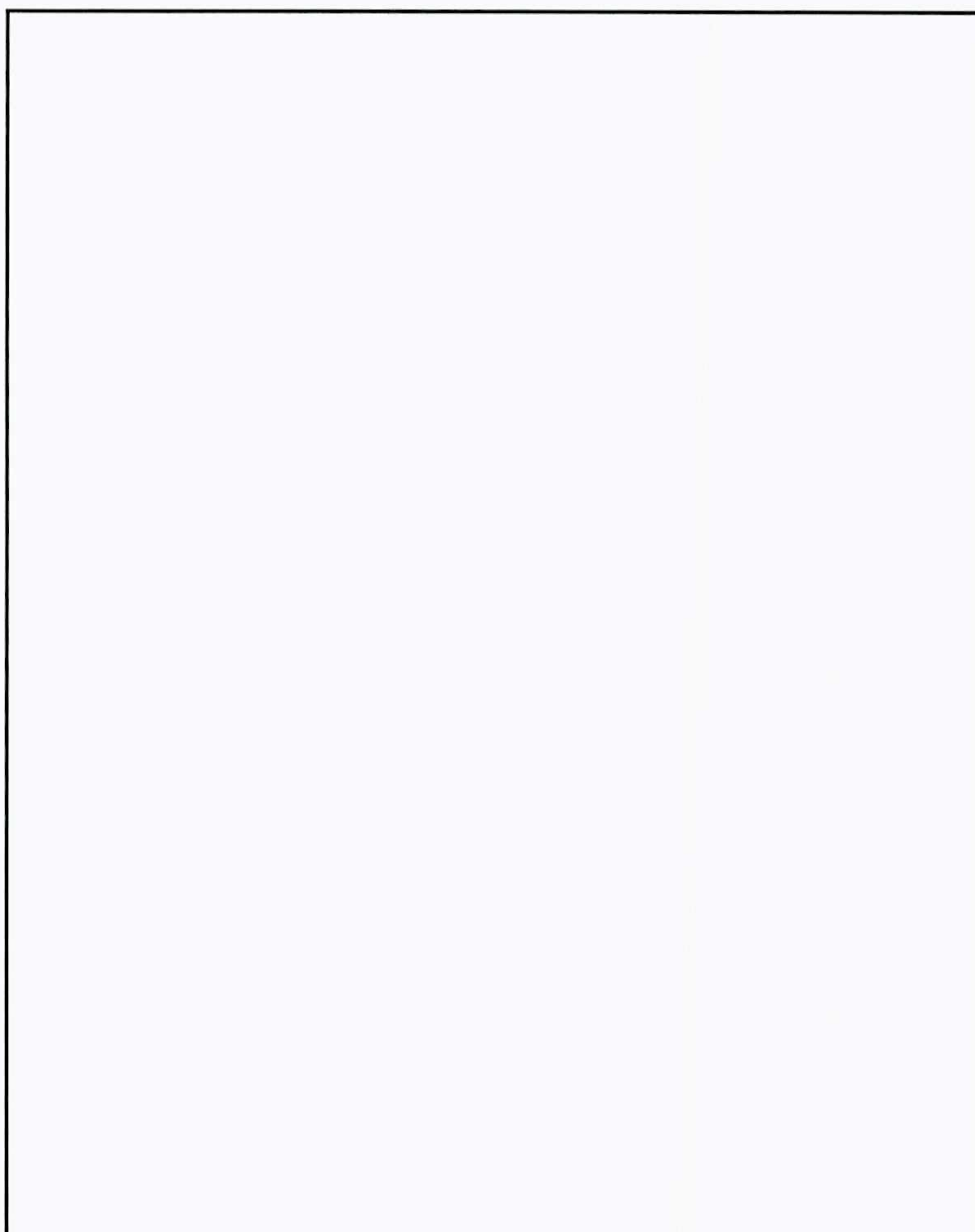


Col. William H. Blanchard, Commander 509th Bomb Group, 1947, and later, Vice Chief of Staff, United States Air Force, 1965–1966. As commander of Roswell Army Airfield and the 509th Bomb Group, Blanchard is alleged to have secretly directed the recovery of a flying saucer while pretending to be on leave. Records indicate that Blanchard *was* on leave, departing Roswell on July 8 and returning on July 23, 1947 (*see Atch 11*). *U.S. Air Force Photo.*



Maj. Gen. Clements McMullen, Deputy Chief of Staff, Strategic Air Command, 1947. General McMullen is alleged to have directed General Ramey to cover up the recovery of an extraterrestrial craft and crew. After an extensive search, the "Command Correspondence" file for the period was located. This file contained privileged and classified information of the highest order between McMullen and Ramey—it contained no information to support the outrageous claim.

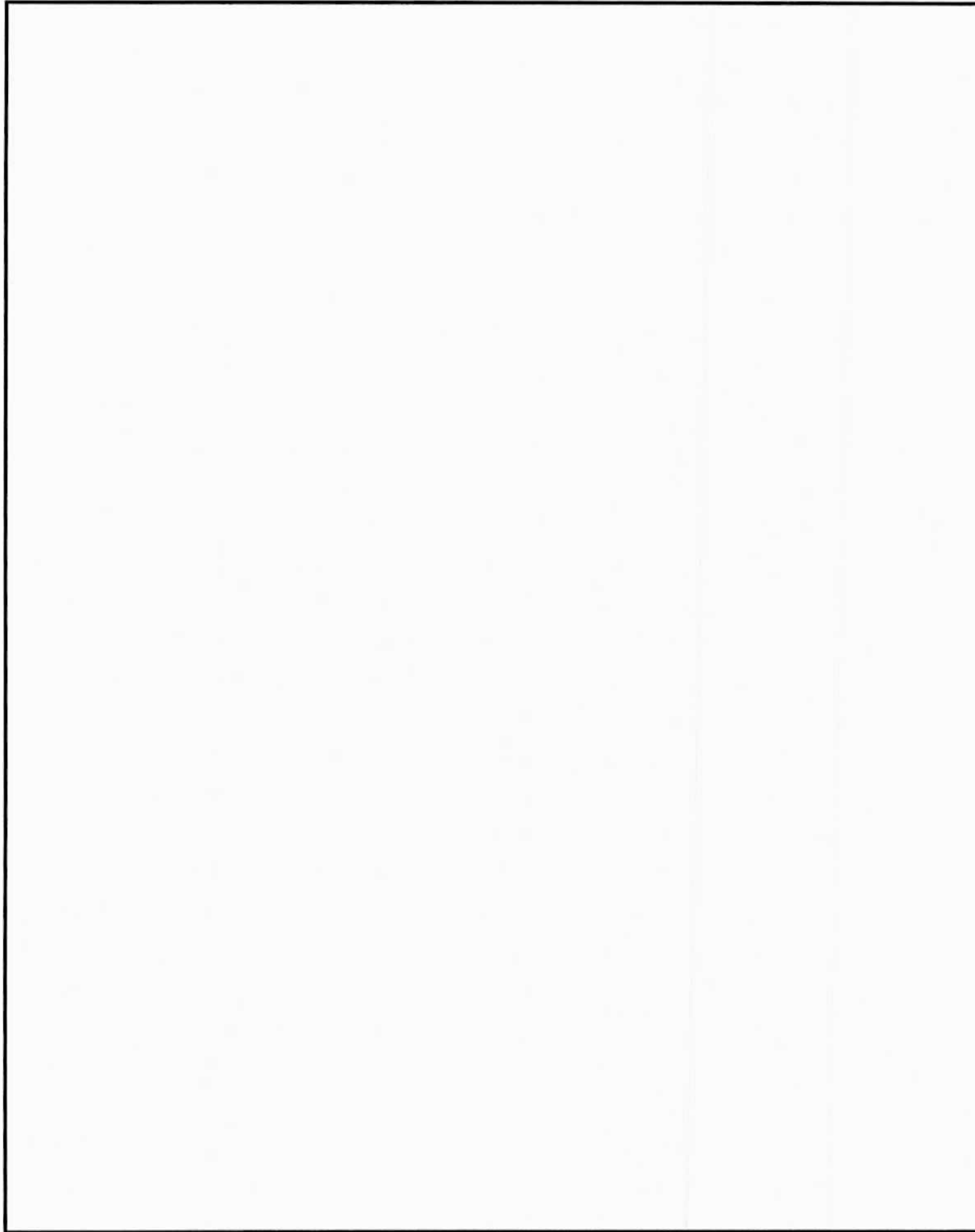
Brig. Gen. Donald N. Yates, Chief, Air Weather Service, 1947, and later, Deputy Director of Defense for Research and Engineering. Crashed saucer theorists contend Yates participated in a conspiracy by confirming the weather balloon explanation for the mysterious debris. They also contend that the debris recovered by the rancher was transported to Andrews AAF, MD (near Washington, DC), to be examined by high government officials including the President. In reality, Andrews AAF was the home of the Army Air Force Air Weather Service and would be a probable location for debris, which contained components of weather equipment, to be identified. *U.S. Air Force Photo.*



Project MOGUL Field Operations Director **Albert P. Crary** maintained a journal of his professional activities including Project MOGUL research in the summer of 1947. Portions of his journal provided details necessary to reconstruct events not available from published MOGUL reports (*see App 17*). In addition to his work for the Air Force, this world-renowned scientist is credited with significant contributions to the field of Antarctic research; a laboratory at McMurdo Station, Antarctica was recently named in his honor.

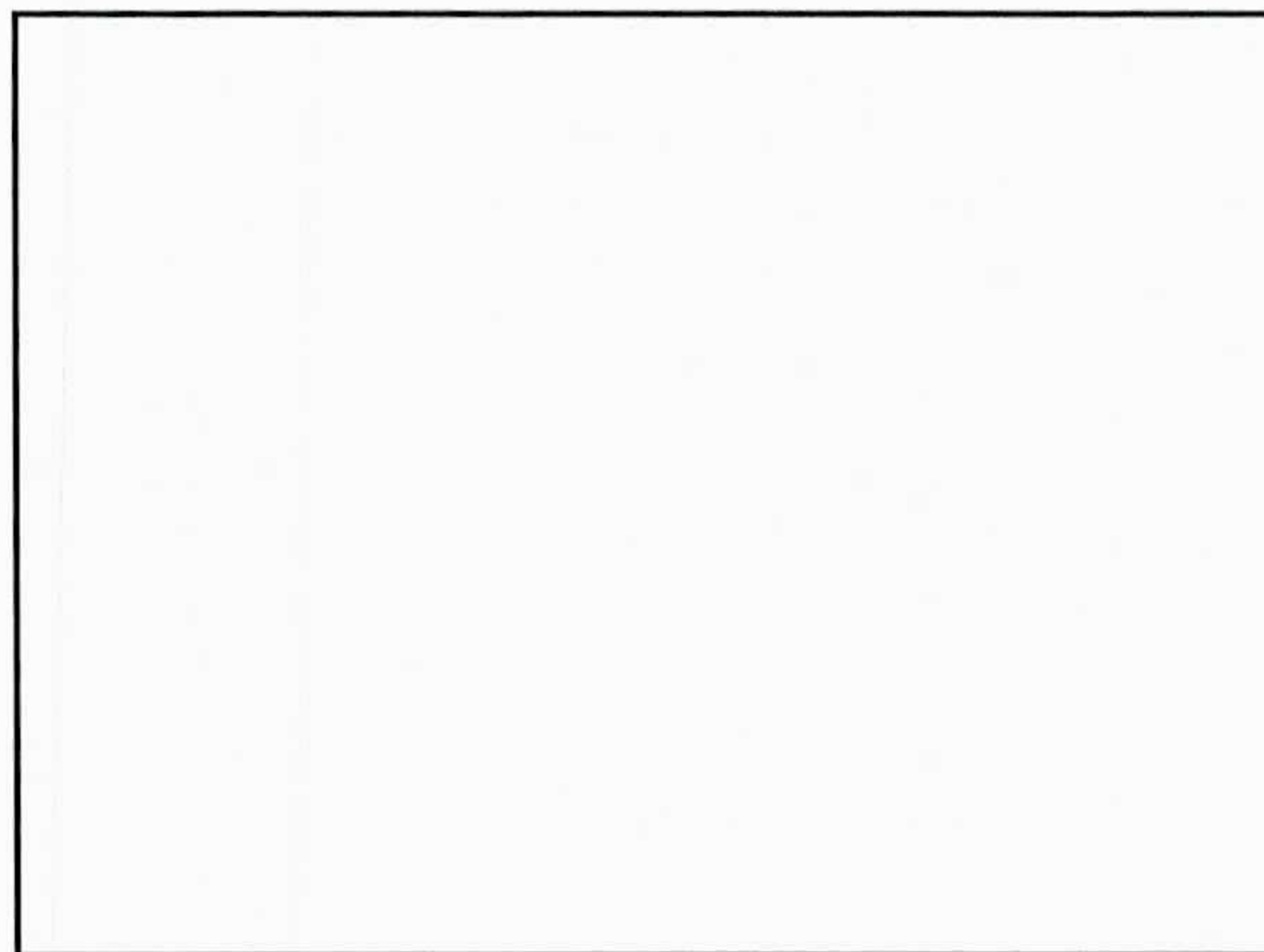
Albert P. Crary (*left*) and technician **Phil Chantz** taking a break during Project MOGUL operations at White Sands Proving Ground, NM, July 1947.



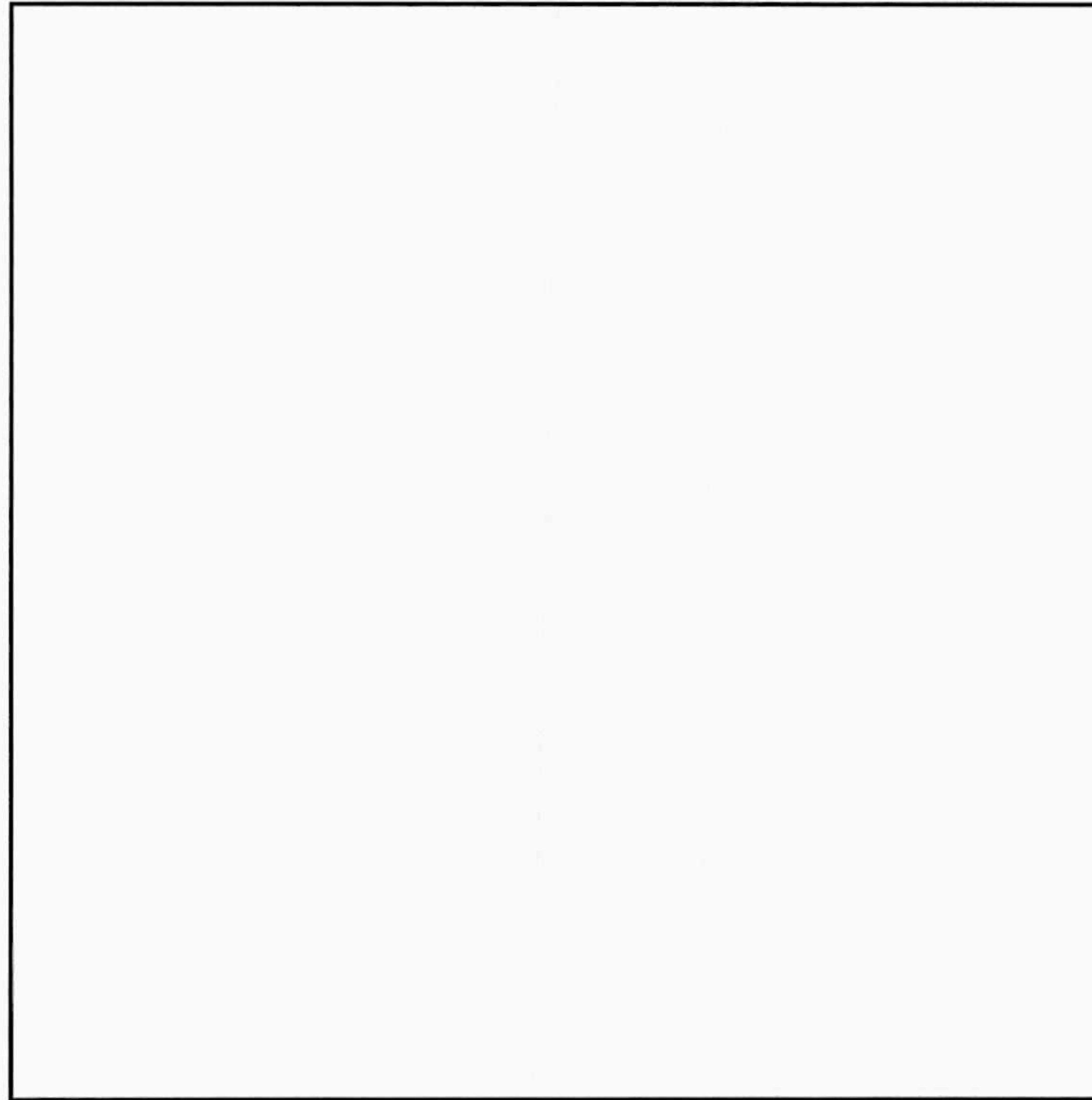


Dr. W. Maurice Ewing, preeminent geophysicist and oceanographer. It was Ewing who first conceptualized the military significance of the atmospheric sound channel. His proposal, made directly to the Commanding General U.S.Army Air Forces, General Carl Spaatz, was well received and resulted in the initiation of Project MOGUL (*see App 6*).
Photo Courtesy of Woods Hole Oceanographic Institution.

The distinguished scientists **Albert P. Crary** (*left*) and **Dr. Maurice Ewing** collaborated at various scientific research institutions throughout their careers, in addition to performing their work for the U.S. Air Force. In the course of their collaborations, these men had affiliations with Lehigh University, Columbia University, and Woods



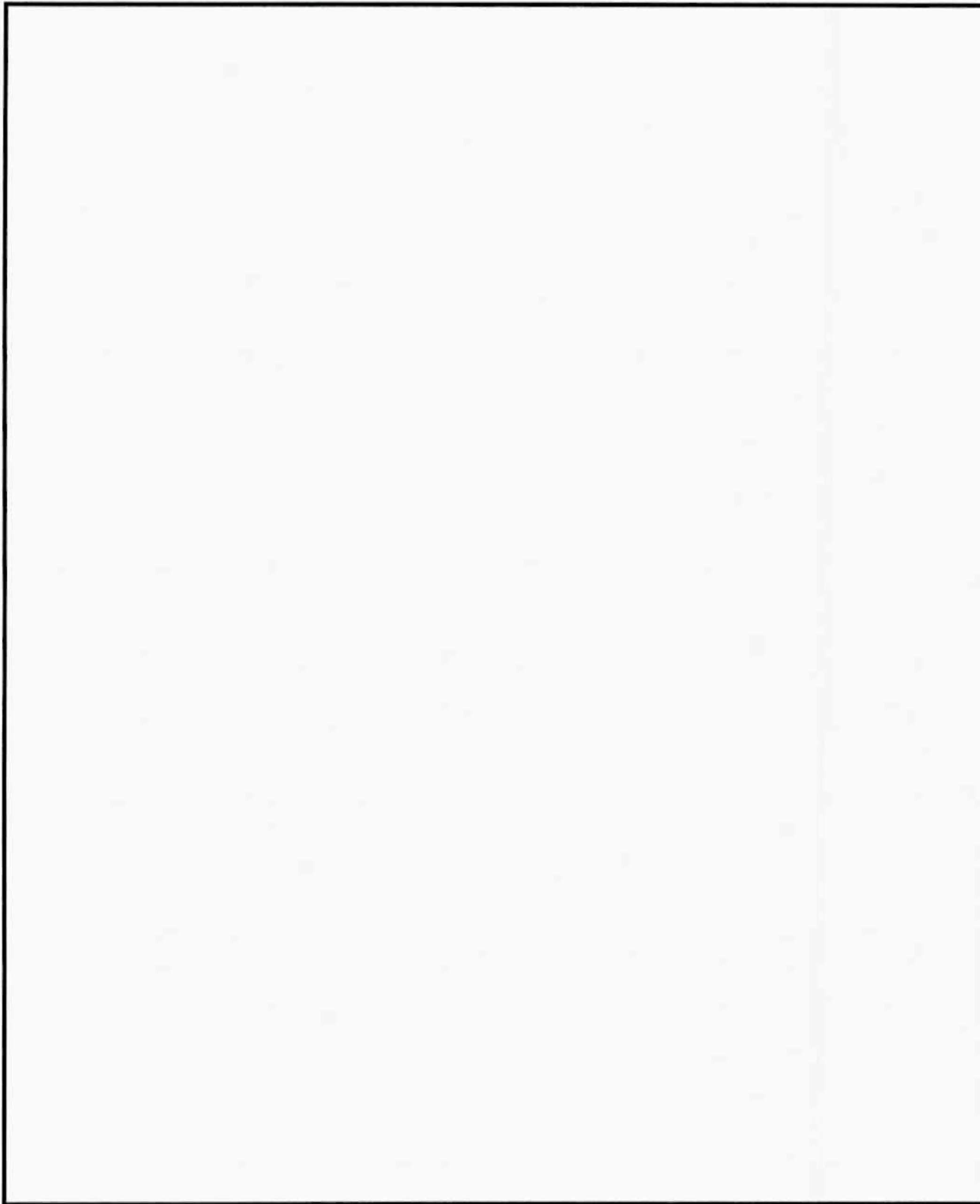
Hole Oceanographic Institution.



Dr. Athelstan F. Spilhaus (*left*) and **Col. Marcellus Duffy** appear here serving as members of HQ USAAF Liaison Group to the U.S. Army Signal Corps, Saipan, in 1944. *Photo Courtesy of Mrs. Emily Duffy.*

Dr. Athelstan Spilhaus, Director of Research at New York University, oversaw but had no direct involvement in the activities of the NYU Balloon Group or the alleged incident. He did, however, serve on various high-level panels which set military and national policy, including the USAF Scientific Advisory Board (1953–1957). When asked, for the purpose of this report—and released from any security oaths he may have taken—if he ever had knowledge of a recovery of an extraterrestrial vehicle or its occupants by the U.S. Government, his unqualified response was “no.”

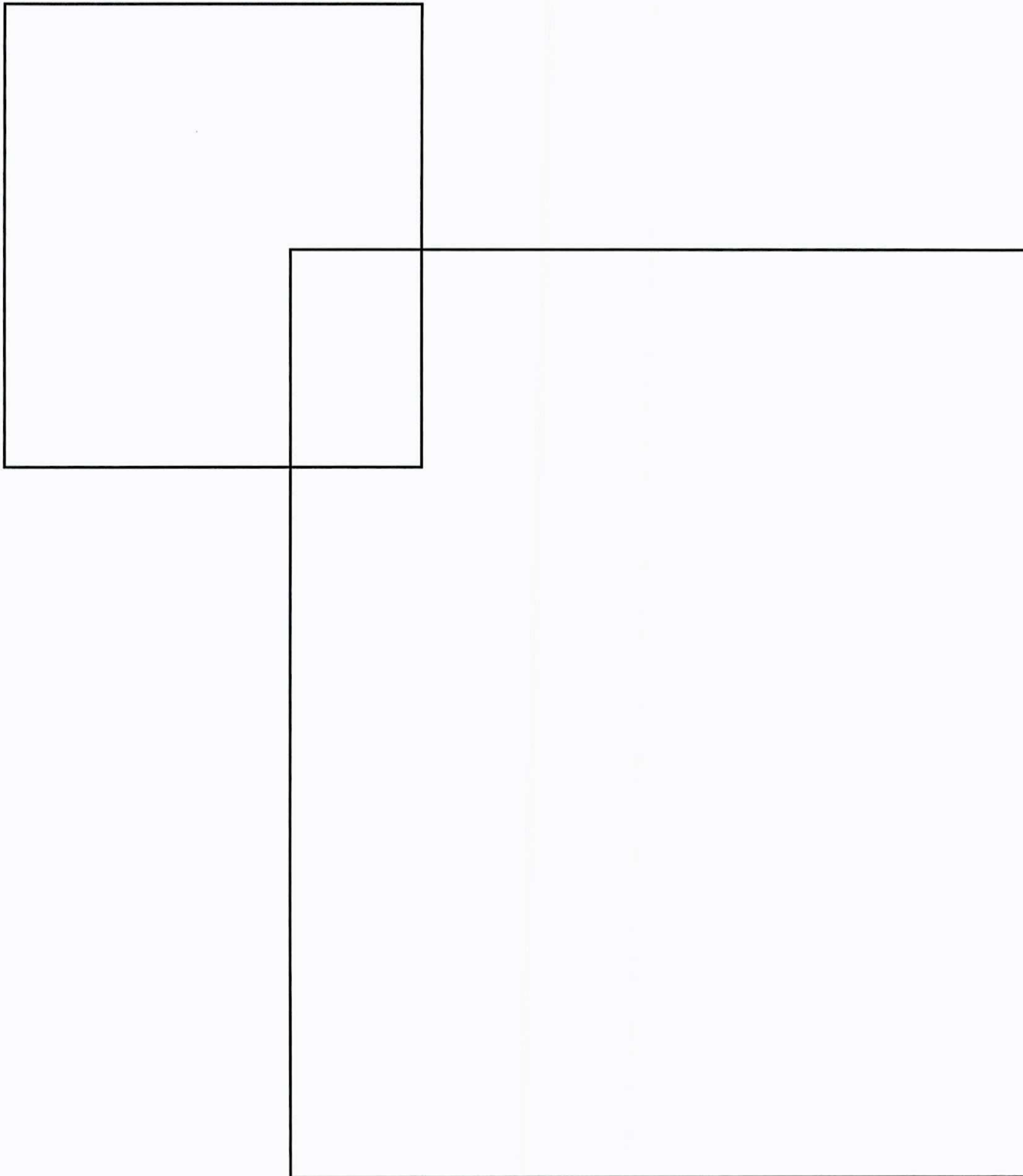
Col. Marcellus Duffy, a highly capable scientific research officer, was a MOGUL project officer. Maj. Gen. Curtis LeMay, Deputy Chief of Air Staff for Research and Development, turned to Colonel Duffy to make adjustments to MOGUL after the project’s progress was determined to be inadequate (*see App 8*).



Capt. Albert C. Trakowski who succeeded Colonel Duffy as MOGUL Project Officer, confirmed in a recent interview that the debris mistaken for part of a flying saucer was flown to Wright Field (now Wright-Patterson AFB) OH, not for scientific analysis as alleged by UFO theorists, but for Colonel Duffy's personal identification. *Photo Courtesy of Col. Albert Trakowski.*

MOGUL Project Scientist Dr. James Peoples. Peoples's decision not to bring the radiosonde tracking equipment for the NYU field trip in June 1947 prompted Project Engineer C.B. Moore to attach additional radar targets to the MOGUL balloon trains. The targets, seldom used in the continental United States, were recovered by the rancher and mistaken to be part of a flying saucer.





Charles B. Moore, NYU Constant-Level Balloon Project Engineer. Moore pioneered the use of polyethylene balloons for upper atmospheric research. He launched NYU flight No. 4 on June 4, 1947, which was the balloon train most likely to have caused what is known today as the “Roswell Incident.” Moore is presently Professor Emeritus of Atmospheric Physics at New Mexico Institute of Mining and Technology, Socorro, NM. *Photo Courtesy of C.B. Moore*

Eiffel Tower

PARIS

1056ft

Project MOGUL
Balloon Train

ALAMOGORDO, NEW MEXICO

657ft

Washington Monument

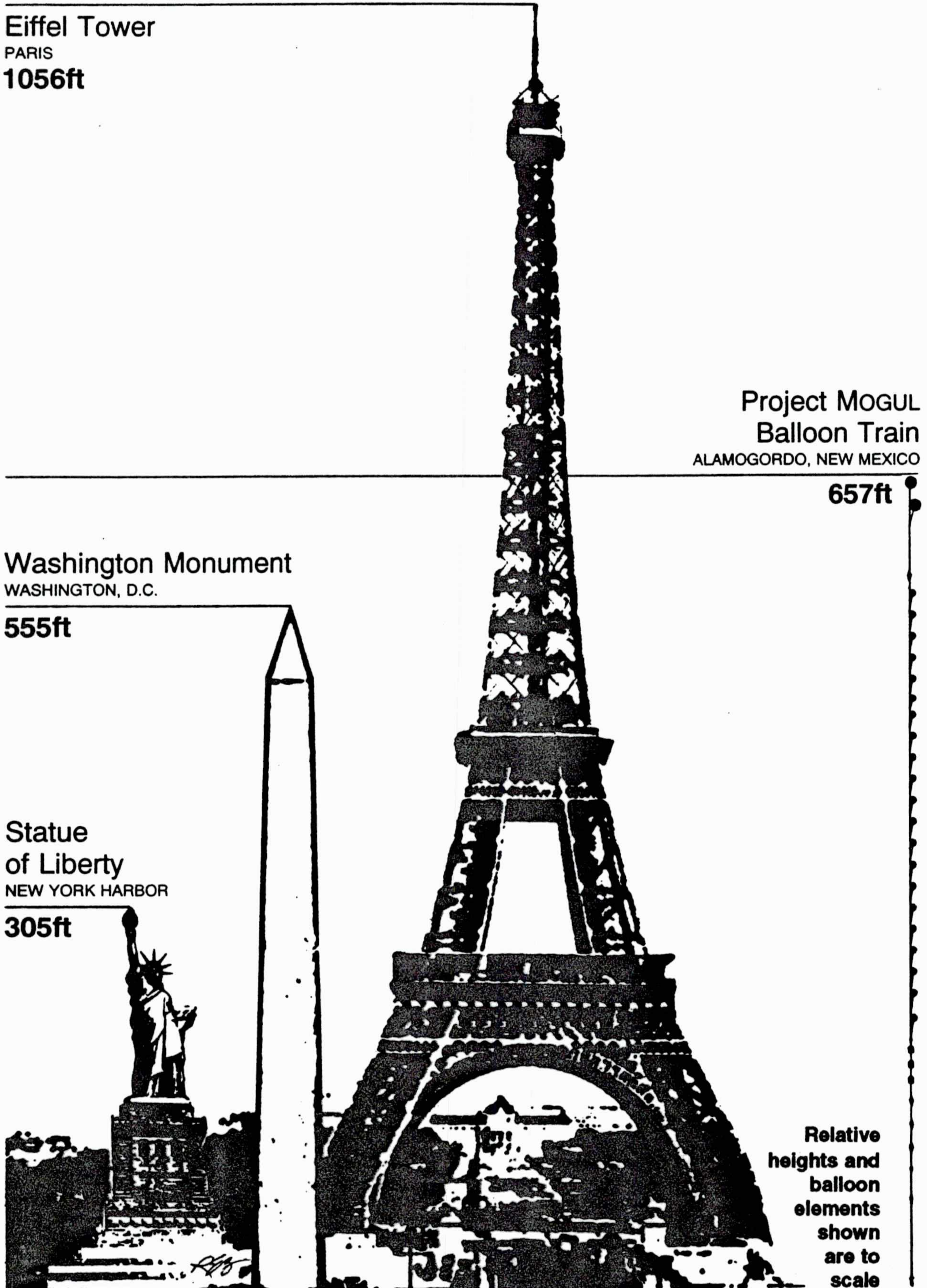
WASHINGTON, D.C.

555ft

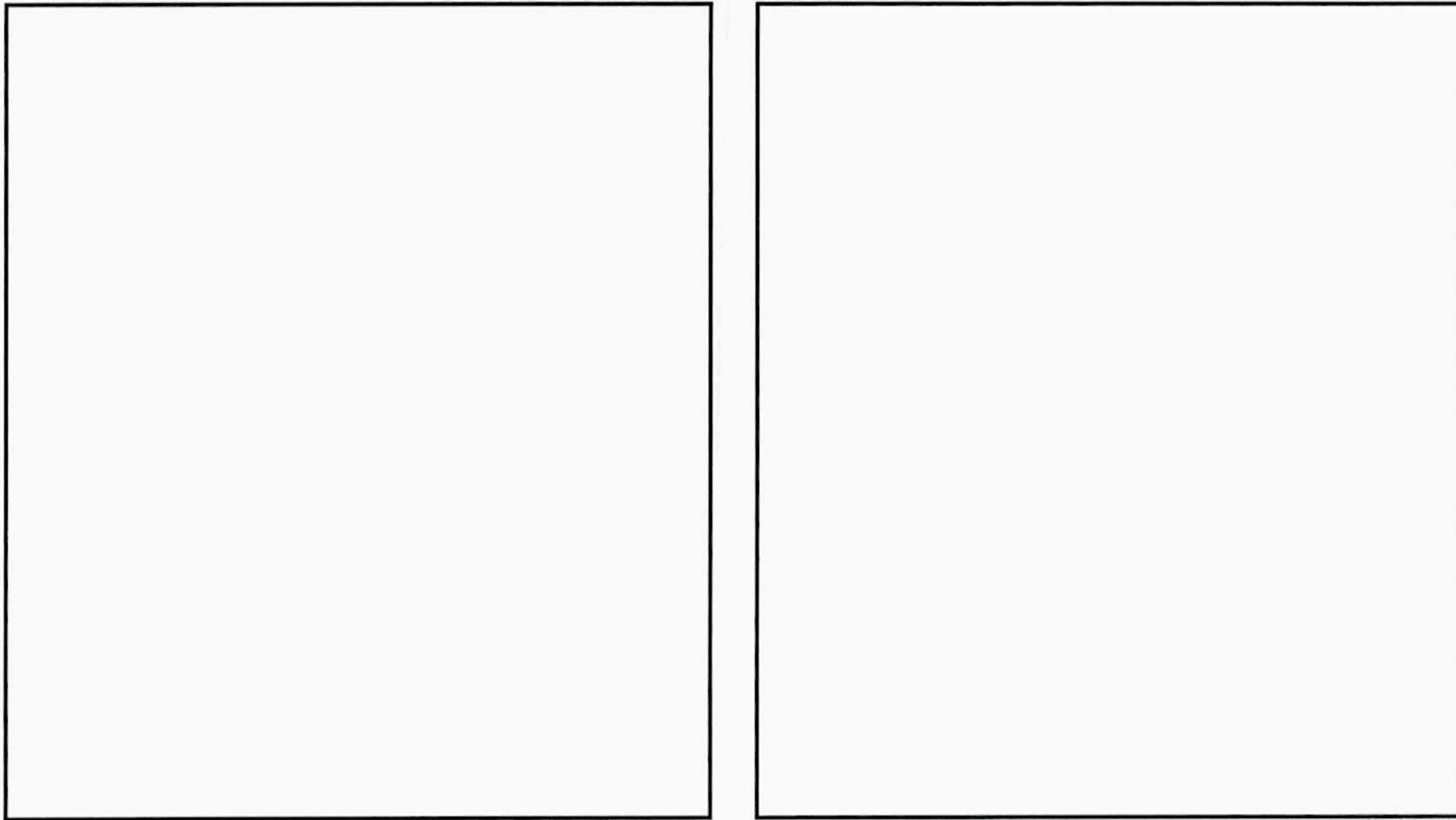
Statue
of Liberty

NEW YORK HARBOR

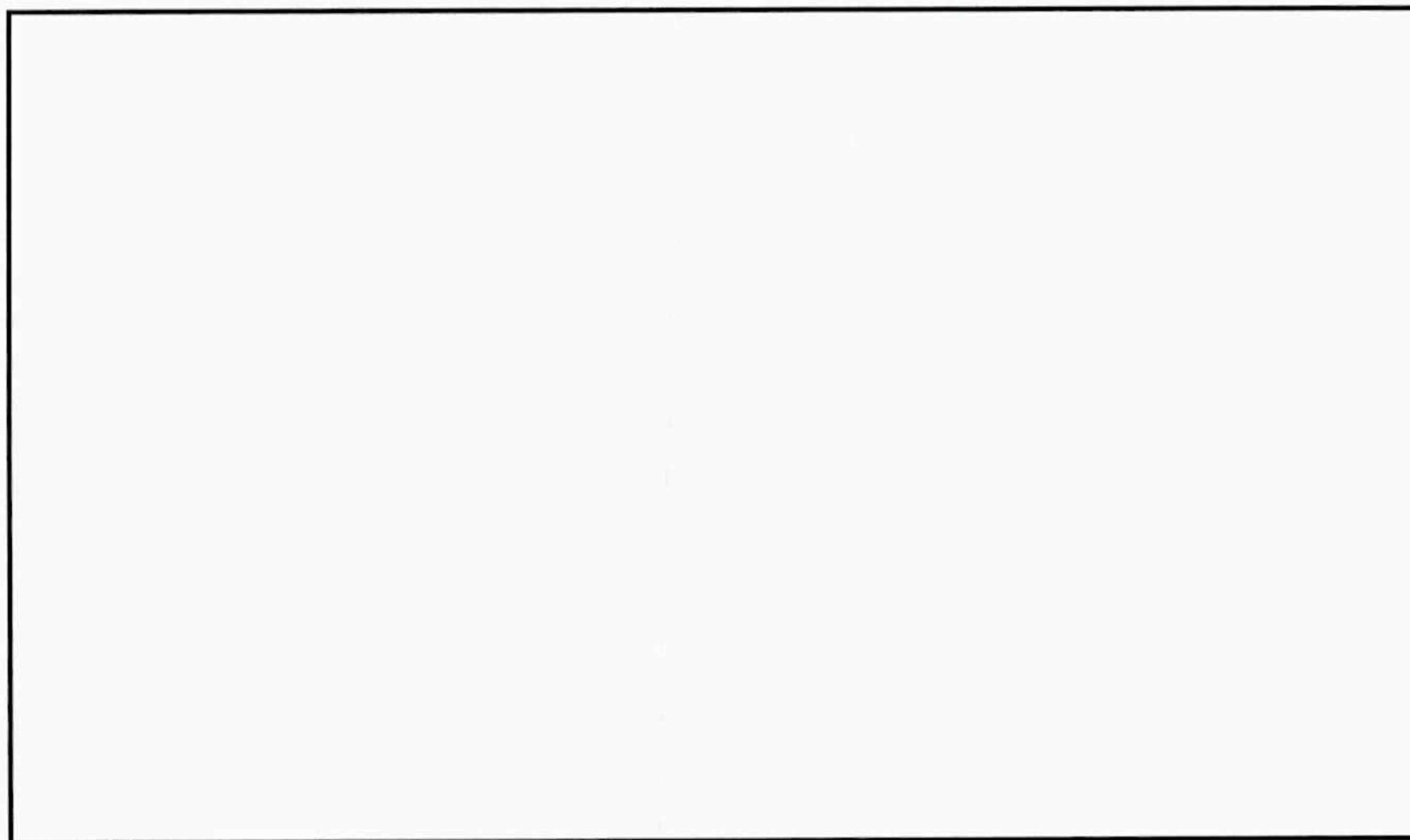
305ft



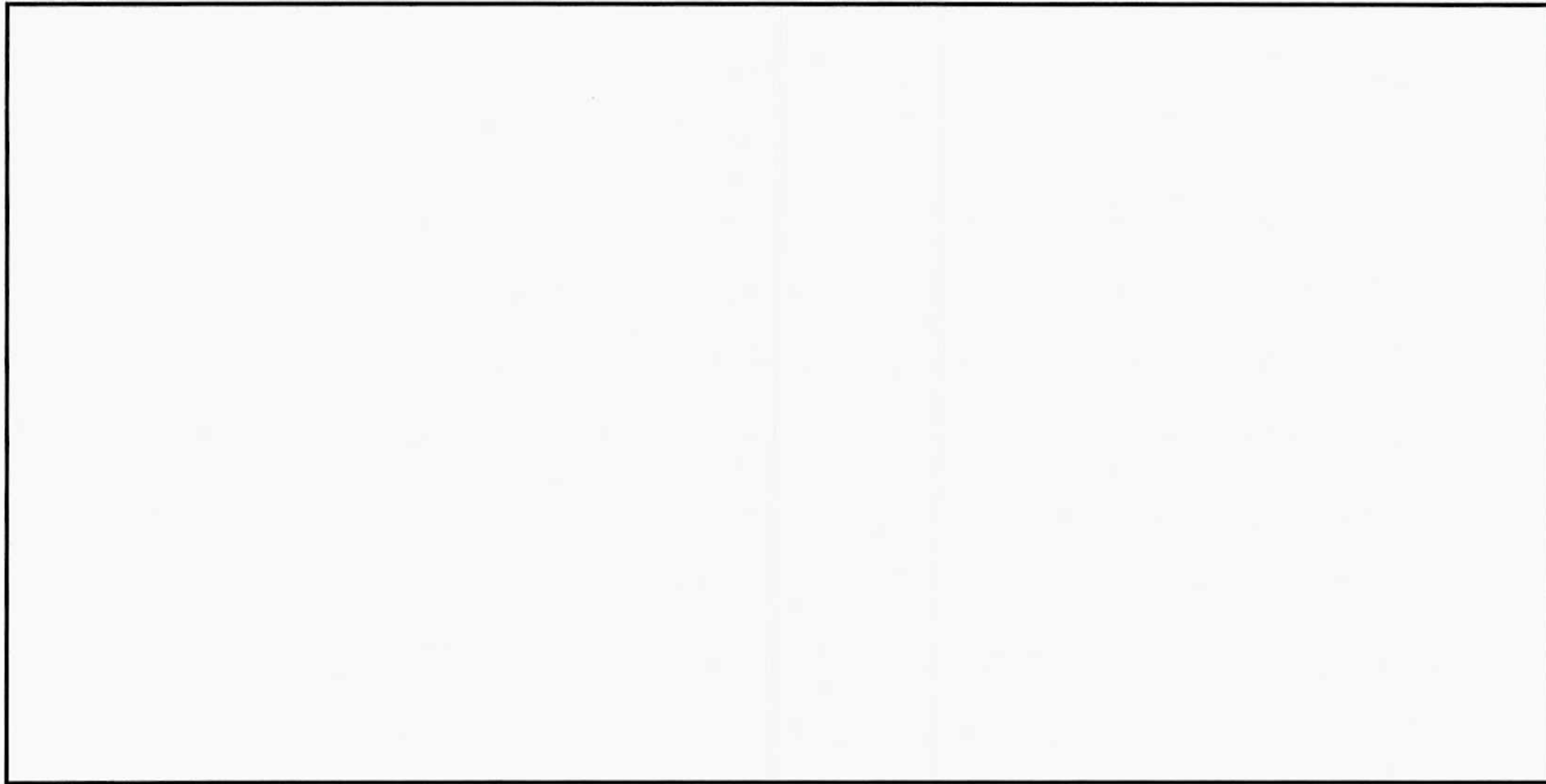
Relative
heights and
balloon
elements
shown
are to
scale



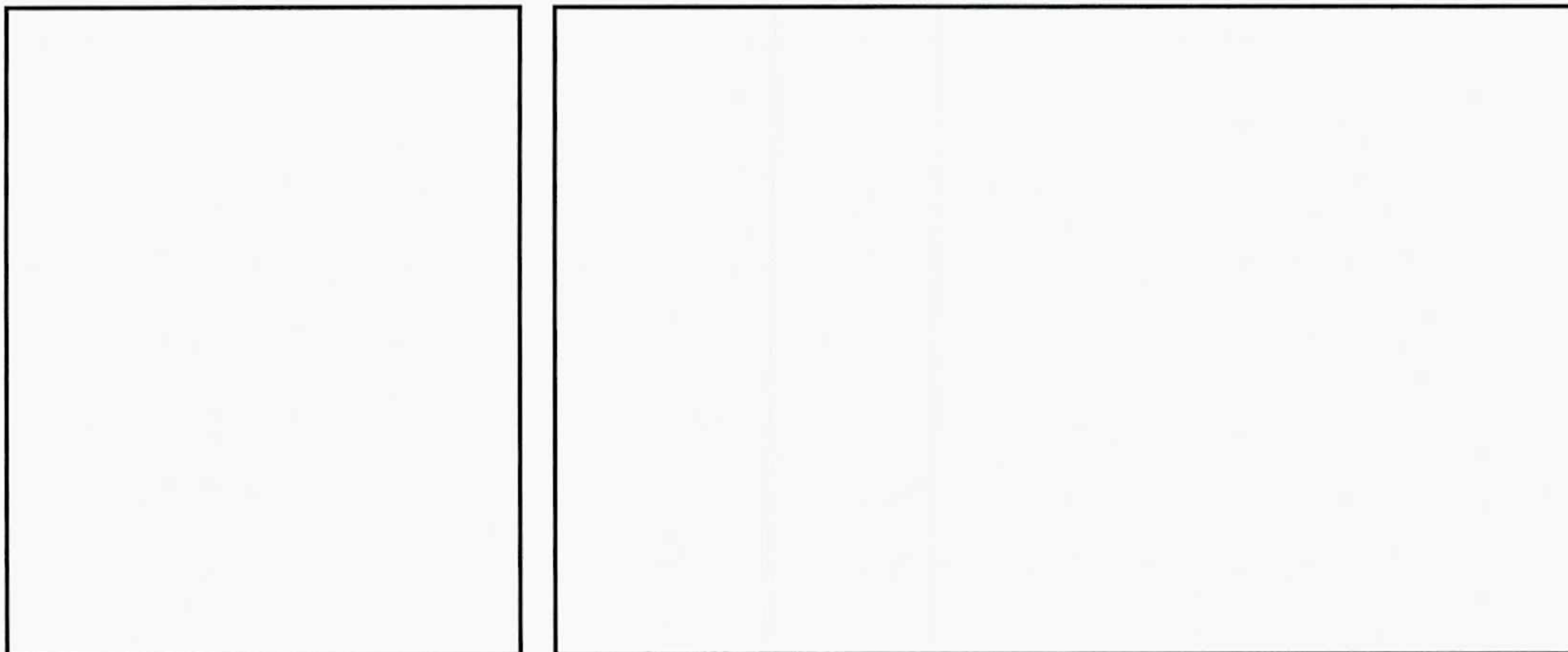
Sitting in the back of the truck (left) is a U.S. Army GR-3 Sound Ranging Set, normally used by field artillery observation units but adapted for use in Project MOGUL. The set was employed for the MOGUL operations at White Sands Proving Ground in July 1947. **The detonation, or “shot” (right)**, of 500 pounds of TNT was monitored at White Sands Proving Ground, NM, in July 1947, by Project MOGUL balloon and ground-based sensors. *Photo Collection of Albert P. Crary.*



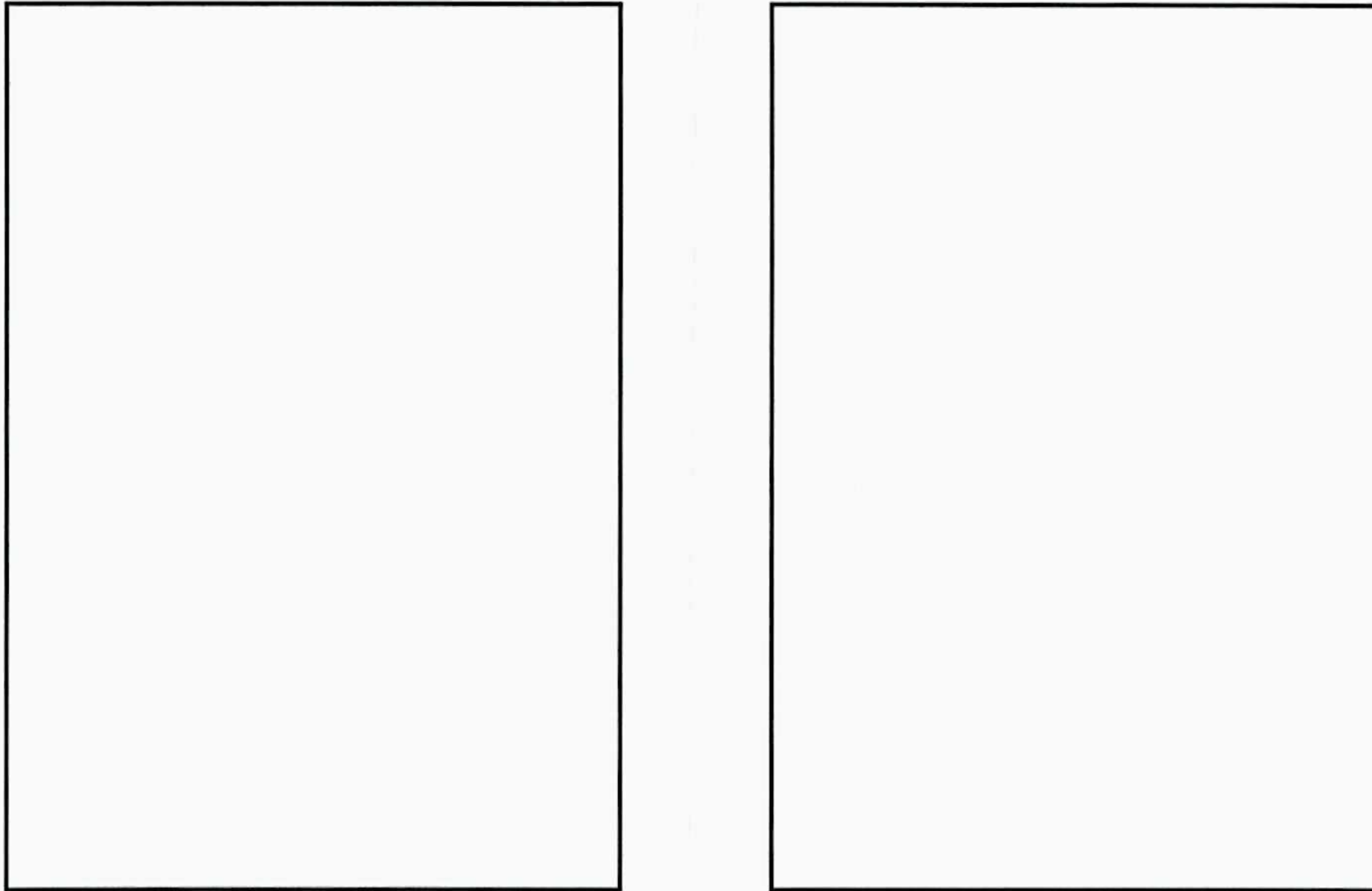
This modified PT boat was assigned to Project MOGUL and is shown here off Block Island, RI. Col. Marcellus Duffy eliminated it and several others from the project when Headquarters U.S. Army Air Forces expressed concerns over the progress of MOGUL under the previous project officer. *Photo collection of Albert P. Crary.*



A New York University launch crew prepares a MOGUL balloon train for flight (Holloman AFB, NM, 1948). The three ML-307C/AP corner reflectors (*left*) are of the type that W.W. “Mac” Brazel recovered on a ranch near Corona, NM, in June 1947.



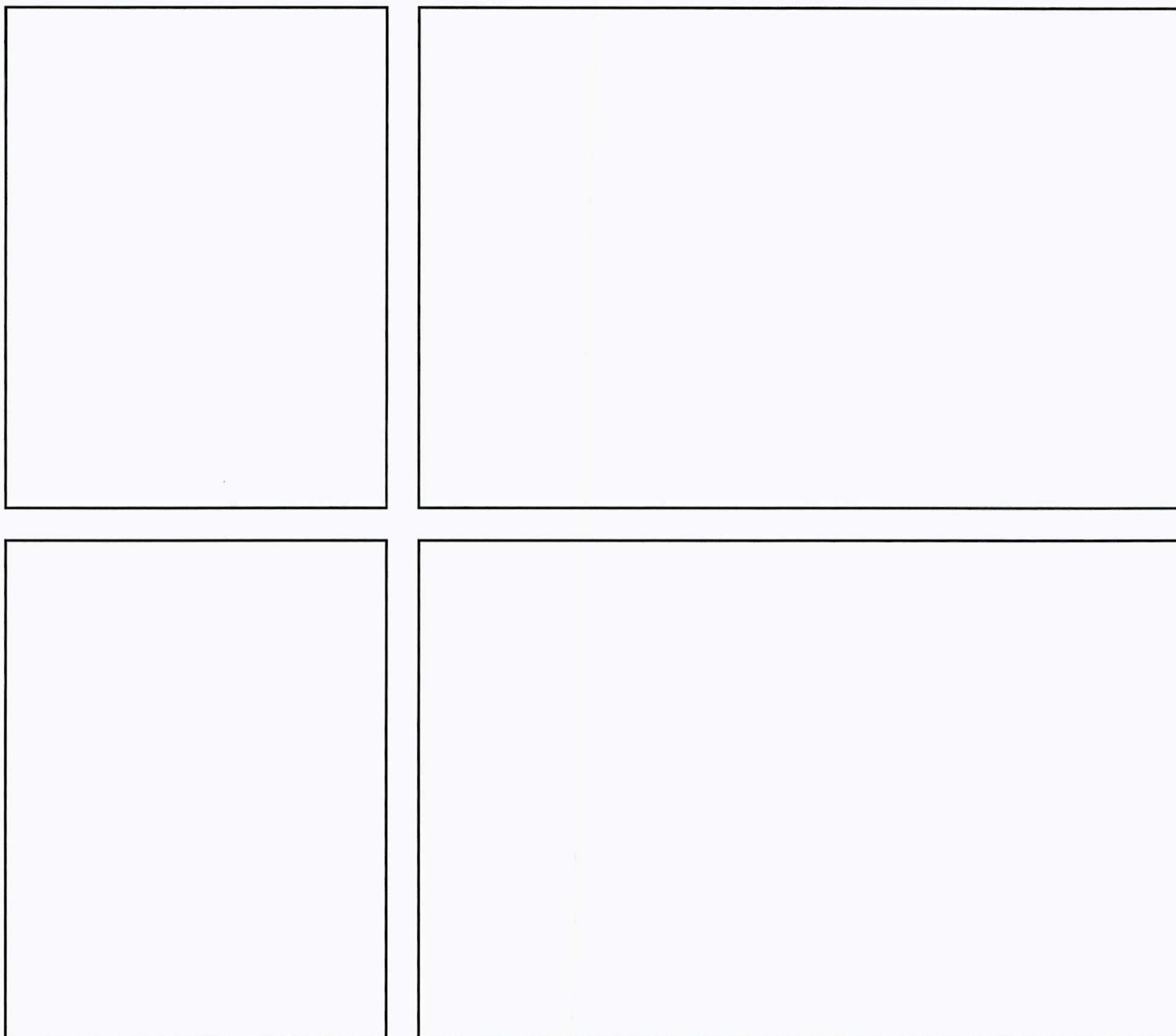
C.B. Moore, New York University Constant Level Balloon Project Engineer (*left and standing*), adjusts an AN/FMQ-1 radiosonde receiver/recorder. The absence of this equipment on the first NYU field trip in June 1947 (it was left behind in New York due to space limitations of the B-17 aircraft) prompted Moore to attach additional ML-307C/AP corner reflectors to MOGUL flights. The addition of the oddly constructed reflectors, intended to enhance radar returns, contributed to the confusion when Mogul Flight No. 4 returned to earth and was mistaken for a part of a flying saucer. Moore (*right and reaching down*) prepares experimental Project MOGUL microphones for launch (Holloman AFB, Alamogordo, NM, July 1948).



Launch of Project MOGUL neoprene balloons, Alamogordo AAF, NM, July 1947. While awaiting the experimental polyethylene balloons, NYU engineers utilized long trains of the smaller neoprene balloons as a stopgap method of placing their acoustic sensors in the upper atmosphere. These balloon trains consisted of a variety of equipment and measured more than 600 feet long (*see Atch 25*). *Photo Collection of Albert P. Crary.*



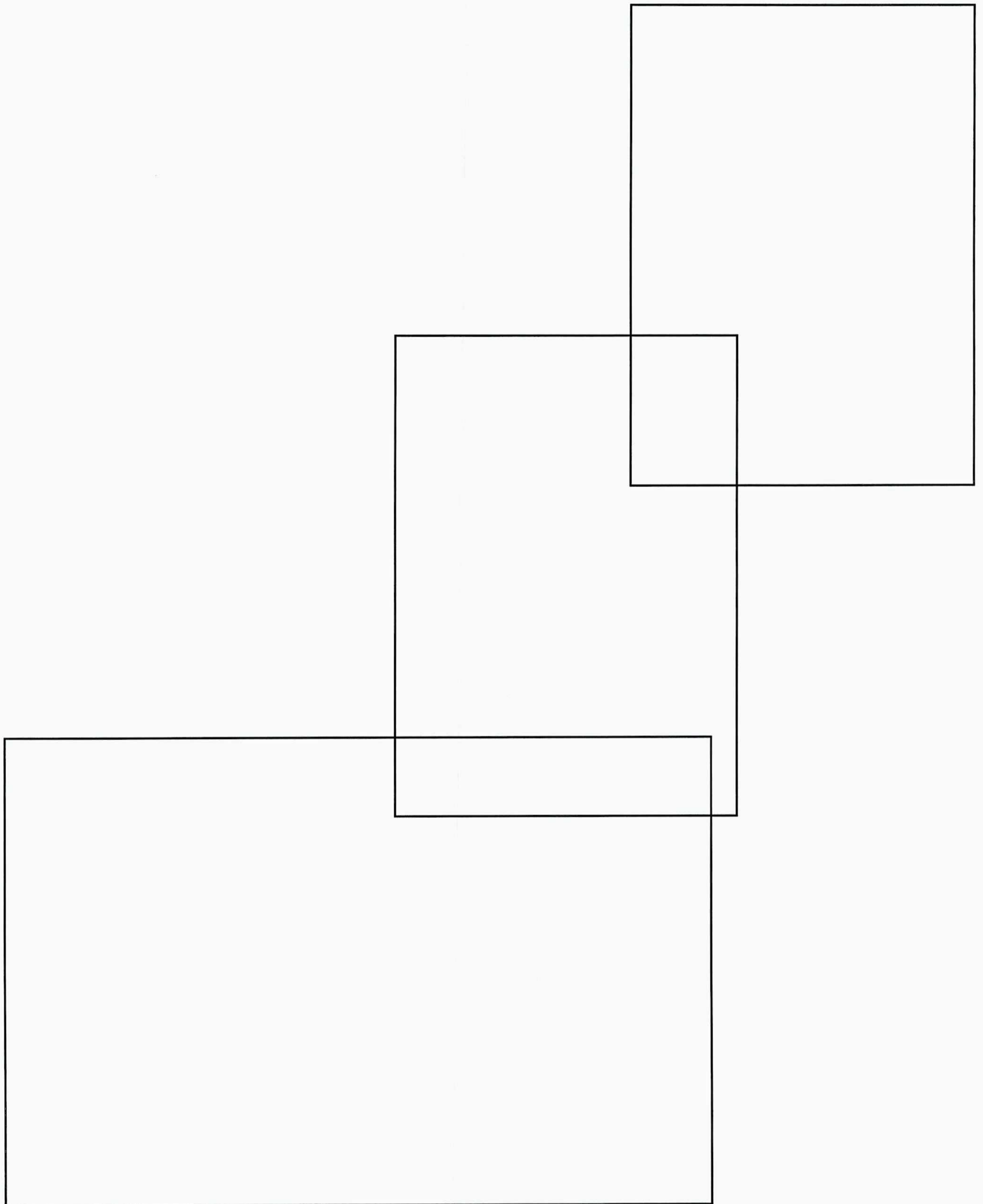
Standard 350-gram meteorological weather balloons in the North Hangar at Alamogordo AAF for use by Project MOGUL in June 1947. Although the balloons themselves were common, the remainder of the equipment on the MOGUL trains was experimental or had been recently placed in service (*see Atch 25*). It would not be unusual for individuals uninvolved in the development of these devices not to recognize them. *Photo Courtesy of C.B. Moore.*



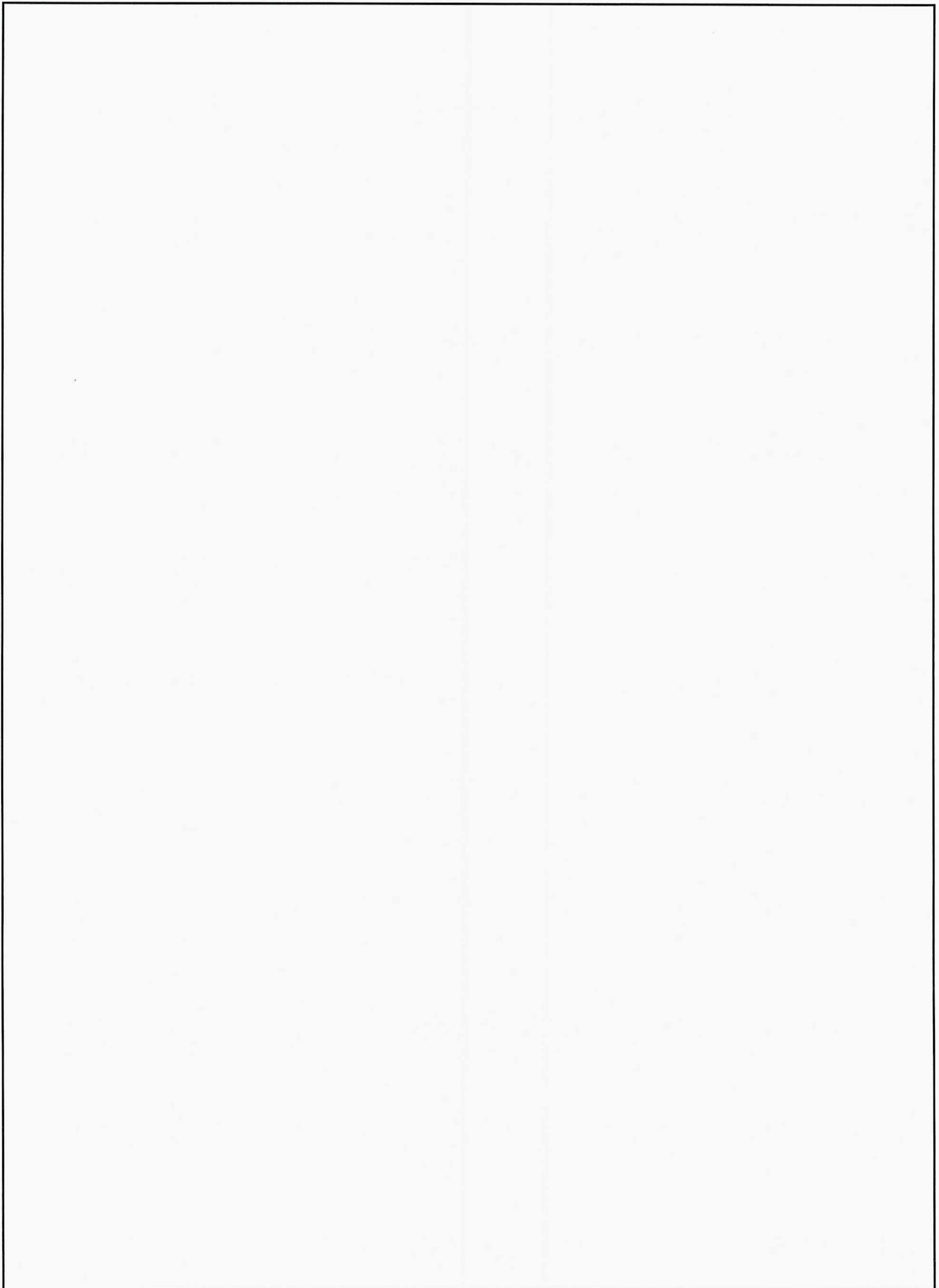
This 15-foot polyethylene balloon (*upper left*) and **70-foot polyethylene balloon** (*upper right*) are representative of the type used extensively by Project MOGUL. It is this variety of balloon that caused many UFO sightings due to their flat, spherical appearance when viewed from the ground.

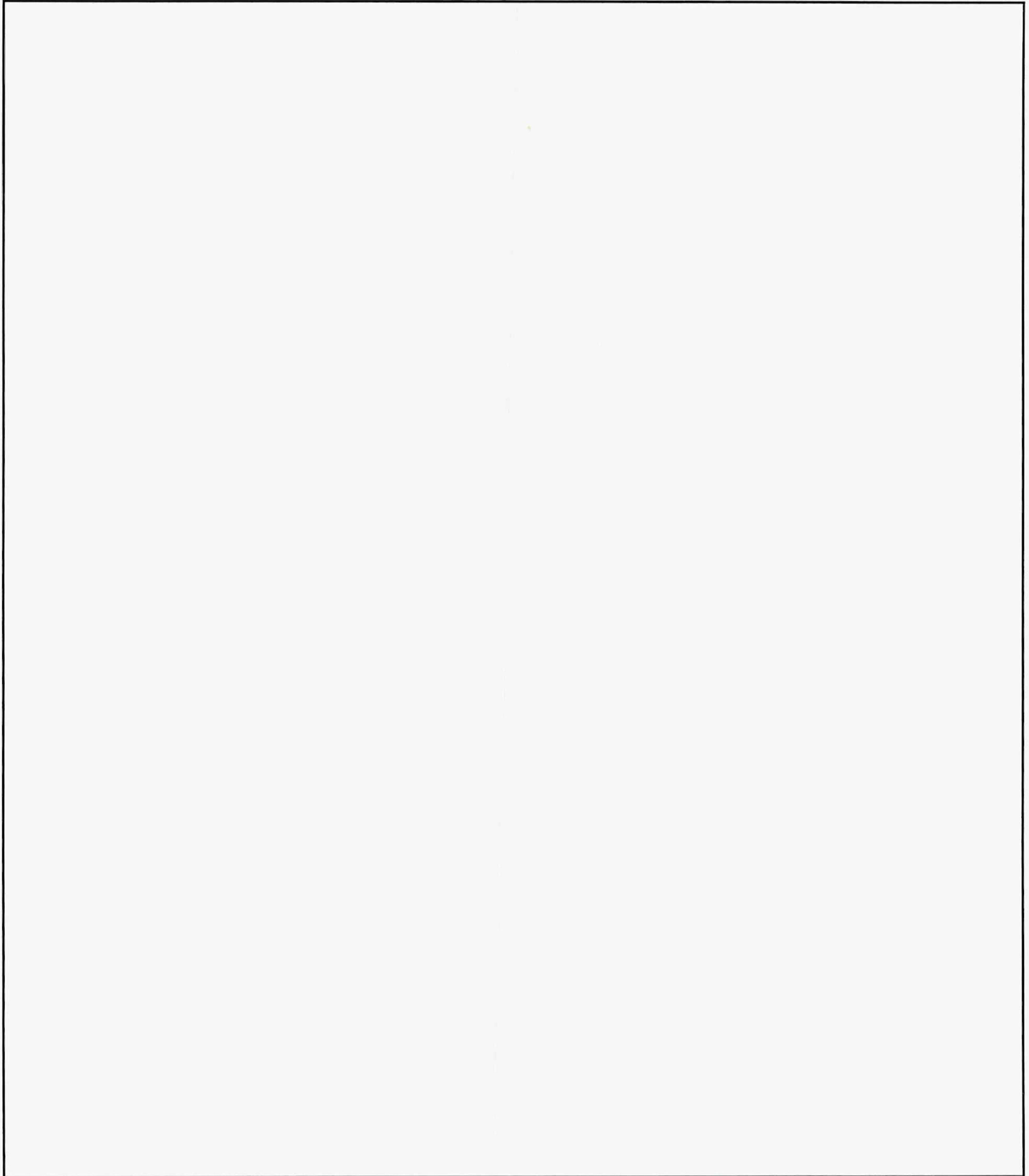
Lying on the desert floor near Roswell, NM, in July 1948 (*upper right*) is a Project MOGUL balloon. Due to the prevailing westerlies, MOGUL balloons often descended in the vicinity of Roswell after launch from Alamogordo. The unpredictability and hazards to aircraft presented by the balloons prompted the Civil Aviation Administration (now the Federal Aviation Administration) to conduct a hearing regarding this issue in August 1947 (*see App 13, pp. 43–44*).

A blimp hangar at Lakehurst Naval Air Station, NJ (*lower left*), contains this Project MOGUL balloon during its preparation for flight.



Also used during Project MOGUL were balloons developed by Seyfang Laboratories, the inventors of the first Macy's Thanksgiving Day Parade balloons. These balloons were easily mistaken for flying saucers due to their shape and metallic exterior coating.





Project MOGUL balloon train components (*left*) can be compared with the debris recovered from the Foster ranch and shown at Forth Worth Army Airfield with Maj. Jesse Marcel. Crashed saucer theorists allege that the debris depicted here is not the original debris collected from the Foster ranch. A switch is alleged to have taken place after the material arrived from Roswell AAF. However, detailed analysis and interviews with individuals who viewed and handled the debris verify it to be consistent with the materials launched by Project MOGUL and subsequently recovered at the Foster ranch.

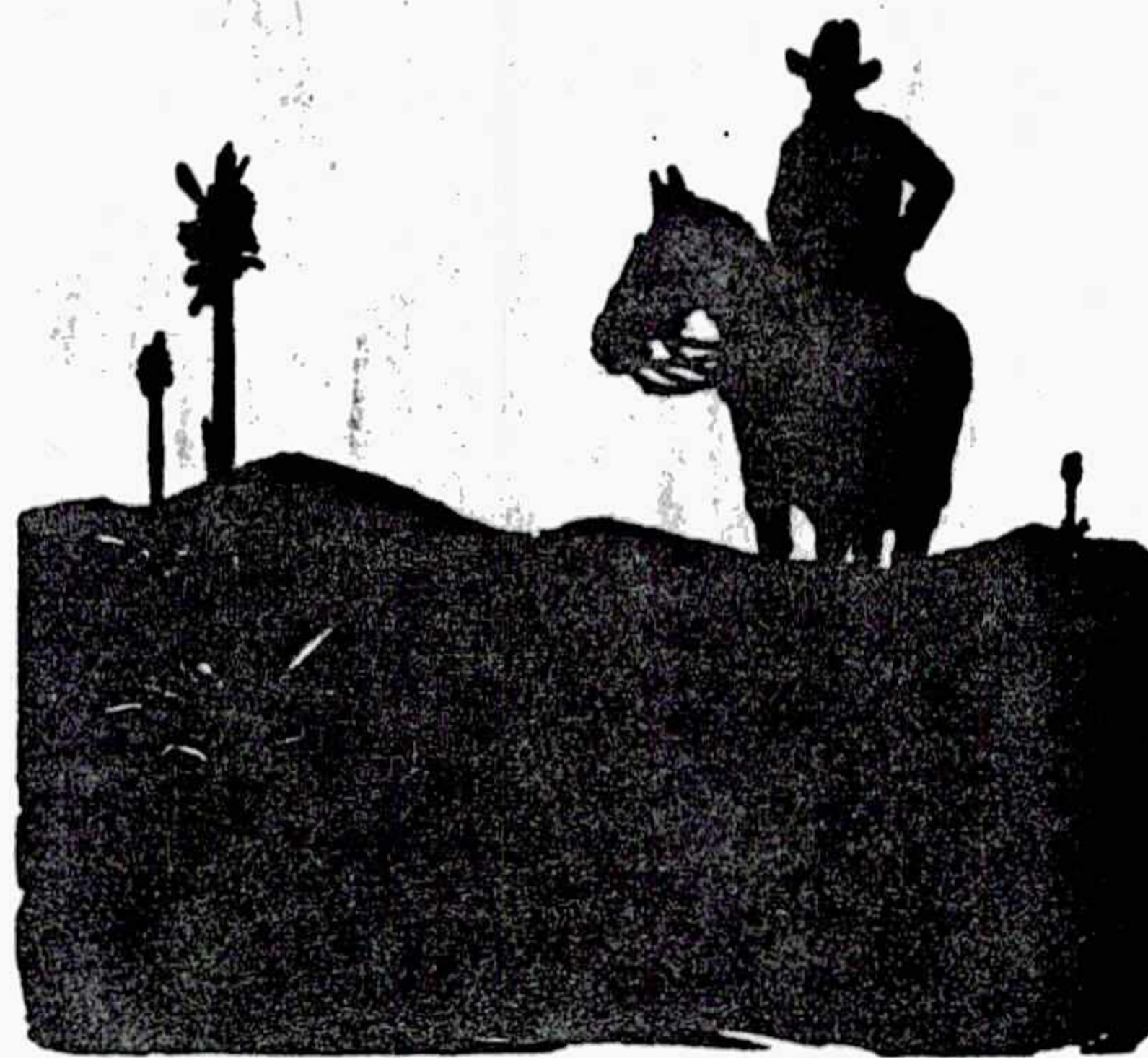
PHOTO SECTION

COVER REPRESENTATION

HEADQUARTERS UNITED STATES AIR FORCE

THE ROSWELL REPORT

Fact vs. Fiction in the New Mexico Desert



Richard L. Weaver and James McAndrew

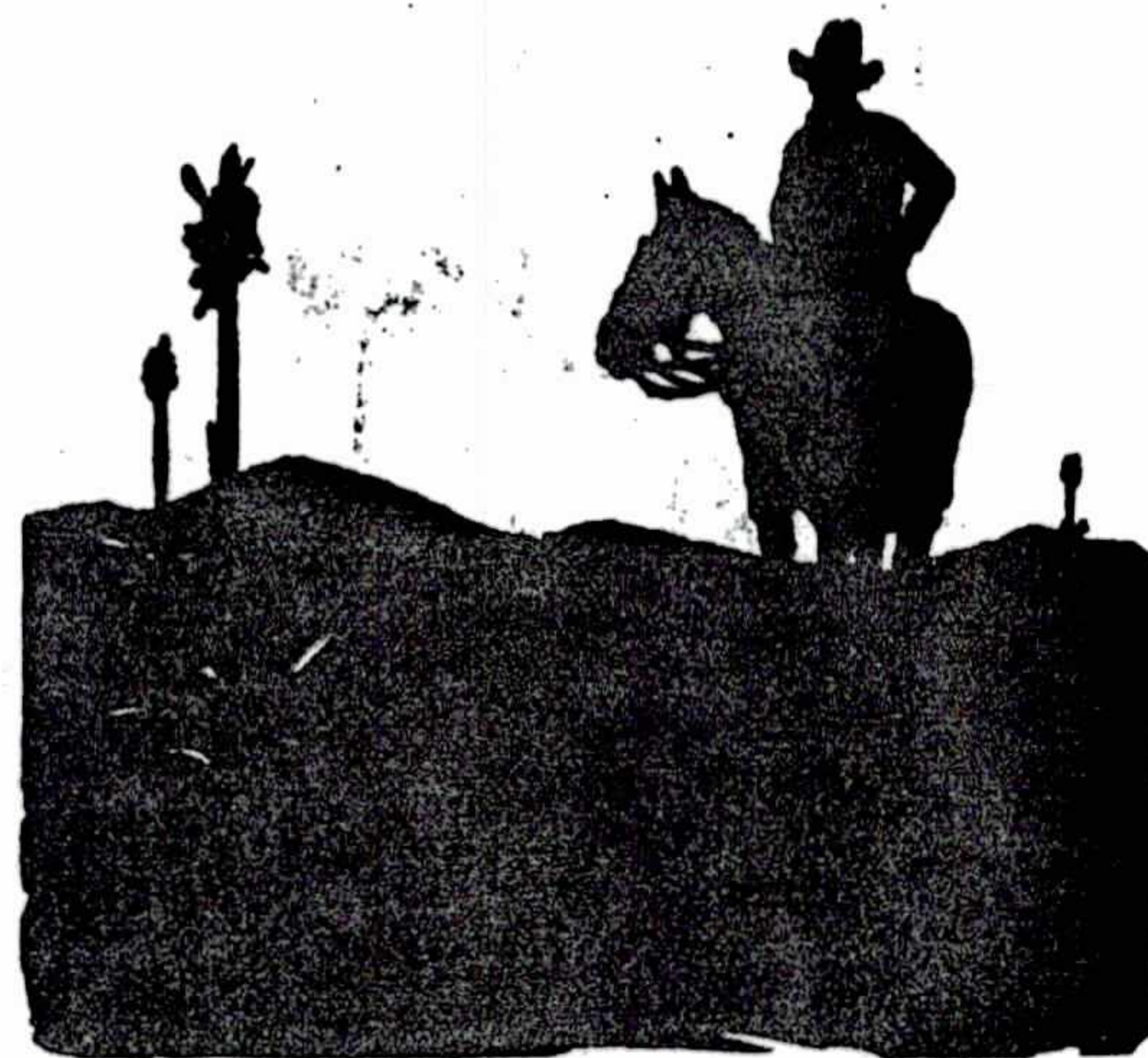
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**TITLE PAGE
REPRESENTATION**

H E A D Q U A R T E R S U N I T E D S T A T E S A I R F O R C E

THE ROSWELL REPORT

Fact vs. Fiction in the New Mexico Desert



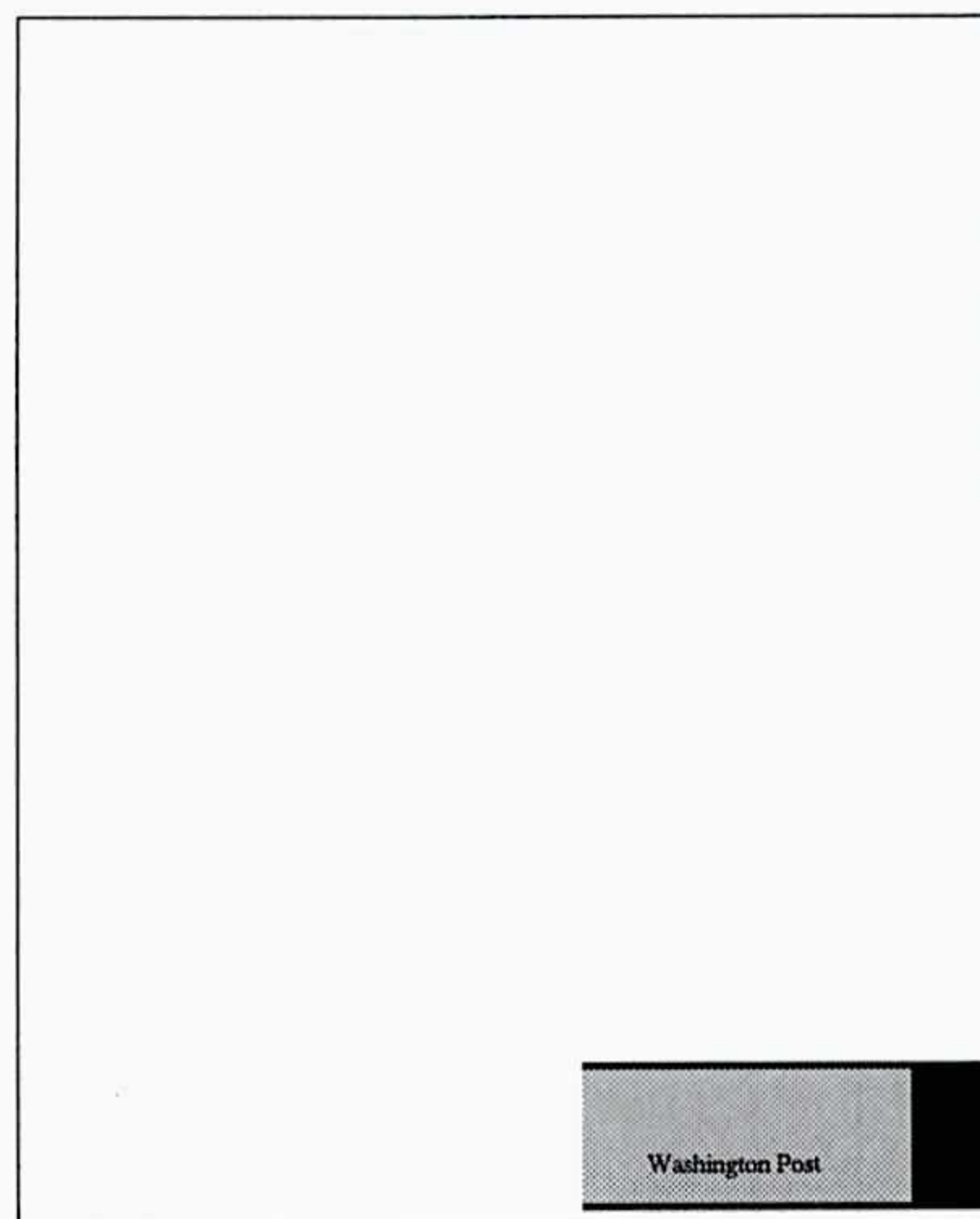
Richard L. Weaver and James McAndrew

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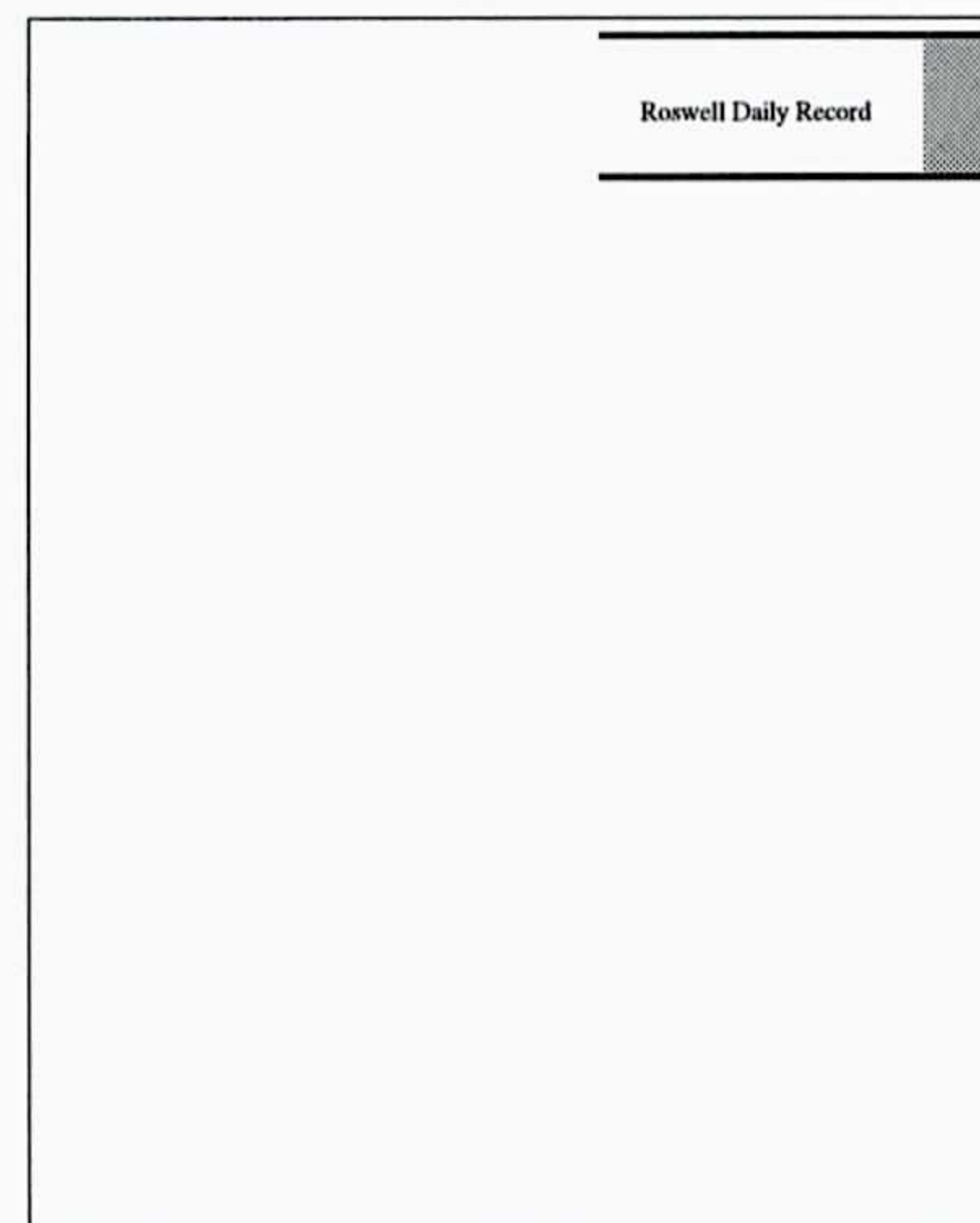
GUIDE FOR READERS

This publication contains two narratives: The *Report of the Air Force Research Regarding the "Roswell Incident"* by Col. Richard L. Weaver and the *Synopsis of Balloon Research Findings* by 1st Lt James McAndrew. The narratives and supporting documents appear as they were originally published, except for minor editorial adjustments. Attachments 32 and 33 of the *Report* have been reversed from their original order for simplicity. In addition to the original report, a photo/illustration section has been added following Attachment 32.

The *Report* contains thirty- three attachments. Attachment 33, the *Synopsis of Balloon Research Findings*, contains twenty-five appendices. Attachments and appendices are identified by numerically ordered tabs. This convention was used to avoid ambiguity since many of the attachments and appendices appeared in other publications and were integrally numbered there. The Attachments are identified by a black tab in the lower right corner of the title page; appendices are identified by a gray tab in the upper right corner of the appendix title page (*see below*).



Attachment



Appendix

INTRODUCTION

Throughout the latter half of the twentieth century the subject of Unidentified Flying Objects (UFOs) has evoked strong opinions and emotions. For some, the belief in or study of UFOs has assumed the dimensions of a religious quest. Others remain nonbelievers or at least skeptical of the existence of alien beings and elusive vehicles which never quite seem to manifest themselves. Regardless of one's conviction, nowhere has the debate about UFOs been more spirited than over the events that unfolded near the small New Mexico city of Roswell in the summer of 1947. Popularly known as the Roswell Incident, this event has become the most celebrated UFO encounter of all time and has stimulated enthusiasts like none other. Numerous witnesses, including former military personnel and respectable members of the local community, have come forward with tales of humanoid beings, alien technologies, and government cover-ups that have caused even the most skeptical observer to pause and take notice. Inevitably, stories coming from the desert have spawned countless articles, books, films, and even museums claiming to have proof that visitors had come from outer space.

In February 1994, the Air Force was informed that the General Accounting Office (GAO), Congress's investigative arm, planned a formal audit to ascertain "the facts regarding the reported crash of an UFO in 1949 [1947] at Roswell, New Mexico." This task was delegated to numerous agencies, but the focus was on the U.S. Air Force, the agency most often accused of hiding information and records on Roswell. The Presidential Science Advisor had also expressed an interest in the investigation. Thereupon, the Secretary of the Air Force directed that a complete records search identify, locate, and examine any and all information available on this subject. From the outset there was no predisposition to refute or overlook any information. Moreover, if any of the information discovered was under security classification, it was to be declassified, and if active or former Air Force officials had been sworn to a secrecy oath, they were to be freed from it. In short, the objective was to tell the Congress, and the American people, *everything* the Air Force knew about the Roswell claims.

Subsequently, researchers conducted an extensive search of Air Force archives, record centers, and scientific facilities. Seeking information that might help to explain peculiar tales of odd wreckage and alien bodies, the researchers reviewed a monumental number of documents concerning a variety of events, including aircraft crashes, errant missile tests, and nuclear mishaps.

The researchers reported to the Administrative Assistant to the Secretary of the Air Force (SAF/AA), the office responsible for both Air Force records and security policy oversight. Within SAF/AA, the tasking fell to the Director of Security and Special Program Oversight and its specialized subunit, the Declassification and Review Team. This team, comprised entirely of Reservists, was well versed in the Air Force's records system and its complex declassification procedures. Previously, Declassification and Review Team members demonstrated their expertise and effectiveness by declassifying millions of pages of Southeast Asian War and Prisoner of War–Missing in Action records.

As this study makes abundantly clear, the Declassification and Review Team found no evidence of any extraterrestrial craft or alien flight crew. In fact, what they did find had been declassified for more than twenty years—a shadowy, formerly Top Secret project, code-

named MOGUL.

Project MOGUL resulted from two important post-World War II priorities set by the Commanding General of the Army Air Forces, Henry H. “Hap” Arnold. These were to continue the cooperative wartime relationship between civilian research institutions and the military, and to maintain America’s technological superiority, especially with respect to guarding against a bolt from the blue—in other words, a devastating surprise attack. MOGUL addressed both of these concerns. Developed partly under contract with leading scientific institutions—such as New York University (NYU), Woods Hole Oceanographic Institution, Columbia University, and the University of California at Los Angeles—MOGUL’s objective was to develop a long-range system capable of detecting Soviet nuclear detonations and ballistic missile launches.

Army Air Forces officials assembled an expert group of military and civilian scientists to carry out the project. The group included Dr. W. Maurice Ewing of Columbia University, a preeminent geophysicist and oceanographer; Dr. Athelstan F. Spilhaus, the Director of Research at NYU who later advised five presidents on scientific and cultural matters; Dr. James Peoples, the Air Force’s civilian project scientist and later editor of the *Journal of Geophysical Research*; Albert P. Crary, also a civilian Air Force scientist, known for significant contributions to Antarctic research; and Charles B. Moore, Project Engineer at NYU and an atmospheric physicist who pioneered the use of giant plastic research balloons still widely used today. Col. Marcellus Duffy, a respected Air Force pilot and scientific administrator, led the project. Capt. Albert C. Trakowski, a young Massachusetts Institute of Technology graduate followed Duffy in the leadership role.

Determining whether the Soviets were testing nuclear devices was of the highest national priority; it demanded the utmost secrecy if the information gained was to be useful. When the Soviets exploded their first atomic device in August 1949, the experimental Project MOGUL was not in operation. However, the explosion was detected by a specially equipped Air Force B-29 aircraft. Accordingly, MOGUL was conducted under stringent security—secluded laboratories, code words, maximum security clearances, and strictest enforcement of need-to-know rules. Nevertheless, while the nature of the project remained shrouded in secrecy, some of its operations obviously could not. The deployment of giant trains of balloons—over thirty research balloons and experimental sensors strung together and stretching more than 600 feet—could be neither disguised nor hidden from the public. Moreover, operational necessity required that these balloons be launched during daylight hours. It was therefore not surprising that these balloons were often mistaken for UFOs. Often, in fact, MOGUL recovery crews sometimes listened to broadcasts of UFO reports to assist them in their tracking operations. Additionally, the balloons were unsteerable, leading to such amusing events as the one reported by the *New York Times* in which a secret MOGUL balloon “floated blithely over the rooftops of Flatbush . . . causing general public excitement . . . before it came to rest on top of a [Brooklyn] tavern.” In another episode, MOGUL balloon recovery technicians directed a B-17 bomber, which was tracking one of the tests, to buzz and scare off a curious oil rig crew that was about to “capture” a balloon train that had fallen near Roswell. The ruse worked. However, too much activity was going on for the project to remain completely hidden. A MOGUL Project Officer later noted that “It was like having an elephant in your backyard . . . and hoping no one would notice.” These occurrences were

typical, leading the recovery crews to describe themselves as *Balloonatics*, due to the predicaments in which the wandering balloons sometimes placed them, but the information the balloons were attempting to obtain was vital.

To attempt to limit unauthorized disclosure, the Air Force employed a security mechanism known as compartmentation. Compartmentation controlled access to classified information by dispersing portions of the research among several facilities and institutions. Each participating entity received only enough information necessary to accomplish its assigned tasks. In the case of MOGUL, only a small circle of Air Force officers received the intimate details that linked together these unrelated research projects. The use of compartmentation along with strict enforcement of the need to know enabled MOGUL to remain a secret—despite its obvious security difficulties—and to remain unevaluated for many years as the cause of the Roswell Incident.

The issue of compartmentation was significant because some UFO researchers assert that members of the 509th Bombardment Group, stationed at Roswell Army Airfield, should have been able to recognize the debris collected at the crash site as that of a research balloon. Although members of the 509th possessed high-level clearances, they were not privy to the existence of MOGUL; their jobs were to deliver nuclear weapons, not to detect them. The unusual combination of experimental equipment did not encourage easy identification that undoubtedly left some members of the 509th with unanswered questions. Some UFO enthusiasts have manipulated these unanswered questions to support their flying-saucer recovery scenario, while eagerly supplying unfounded explanations of extraterrestrial visitation and cosmic conspiracy. Additionally, many claims of a flying saucer crash at Roswell rest on the description of debris collected at the Foster ranch site. UFO researchers, including those who are said to have known *all about* MOGUL, apparently did not compare the descriptions of the suspect debris with that of the components of a Project MOGUL balloon train. MOGUL reports and documents that contain descriptions, illustrations, and photographs have been publicly available for at least twenty years. Had the researchers completed even a cursory comparison, they would have found that the materials were suspiciously similar; detailed examination would have shown them to be one and the same. In the final analysis, it appears these individuals have pursued the convenient red herring provided by Roswell Army Airfield, while the real explanation lay just over the Sacramento Mountains at the MOGUL launch site in Alamogordo.

This report explains the events that transpired in and near Roswell, New Mexico, in the summer of 1947. It is based on written documentation and first-hand accounts of participants, all of which are provided here in their entirety. While these answers are not as titillating as tales of unearthly craft and creatures, it is a fascinating story nonetheless.

JAMES McANDREW, 1st Lt, USAFR
Declassification and Review Officer
SAF/AAZD

ACKNOWLEDGMENTS

This report and publication would not have been possible without the expert assistance and outstanding cooperation of many persons and organizations. Appreciation is extended to the Administrative Assistant to the Secretary of the Air Force, Mr. William Davidson, and to his predecessor, Mr. Robert McCormick. The Air Force Historian, Dr. Richard P. Hallion, generously offered the services of his staff and facilities. Col. Jeffrey Butler, of the Secretary of the Air Force Office of Security and Special Program Oversight, made signal contributions to both the research and writing of this report.

The primary research conducted for this report was provided by the Secretary of the Air Force's Declassification and Review Team (SAF/AAZD), headed by Col. Linda Smith. Lt. Col. Dale Freeman and Maj. Len Shoemaker initiated the project. Maj. Bill Coburn, CMSgt. Owen Costello, and MSgt. Jean Hardin provided invaluable assistance throughout. SSgt. Jim Bruns acquainted himself with the numerous research facilities available in the Washington, DC, area, and contributed mightily to the effort. Grace Rowe, the Records Manager for the Secretary of the Air Force, provided unparalleled guidance and counsel to help sort through fifty years of records amassed by the U.S. Air Force.

At Bolling AFB, we are indebted to Col. George Williams, Commander of the Air Force History Support Office, and to his staff for their expert advice, guidance, and kind use of facilities. Our foremost debt is owed to historian/archivist Sheldon Goldberg, who greatly assisted our efforts. Additionally, historians Alfred Beck, William Heimdahl, Roger Miller, Eduard Mark, and Jacob Neufeld shared with us their wide knowledge of Air Force history. Also, Robert "Gus" Bell contributed with his attractive art work; Richard Wolf provided invaluable computer expertise; and Maj. Myrt Wilson, SSgt. Steve Rapp, SRA Francis Noel, and Debra Moss supplied essential administrative assistance. Special thanks go to editor Barbara Wittig for bringing her ample talent and focus to this undertaking.

A special thank-you goes to Bruce Ashcroft, chief historian at the National Air Intelligence Center, Wright Patterson AFB, OH. Mr. Ashcroft gave freely of his official and personal time to provide assistance whenever we asked. Moreover, his unique previous experience, as a historian in the State of New Mexico, added a wealth of detail that would otherwise have been missed.

We must also express our sincerest gratitude to the staff of the USAF Phillips Laboratory, Geophysics Directorate at Hanscom AFB, MA, especially to Lisa Duffeck, of the Research Library, whose research talents contributed significantly to this report. We thank John Armstrong, also of the Research Library, for having the foresight to preserve the old balloon files; Neal Stark and Jack Griffin, of the Geophysical Directorate's Aerospace Engineering Group, whose corporate knowledge of Air Force ballooning answered many difficult questions; and to historian Ruth Liebowitz for sharing her files and photographs. Many thanks also to Sheilagh Banacos in Information Management and Evelyn Kindler of the Public Affairs Office.

At the National Archives and Records Administration in Washington, DC, it was a pleasure to collaborate with archivist Edward Reese of the Military Reference Branch. Mr. Reese, who retired in October 1994 after more than fifty-three years of faithful civil service, provided a much-welcomed professional logic and calm to our endeavors. Also, at the Military Reference Branch, Wil Mahoney's knowledge of Air Force records proved invaluable. At the Washington National Records Center in Suitland, MD, we thank Reference Section archivist Carry Conn, who patiently led us through the stacks, and Richard Boylan, Reference Branch Assistant Chief, for his truly prodigious memory. At the National Personnel Records Center, in St. Louis, MO, archivists Bill Siebert and Eric Voltz helped to map out a search plan, while Carl Paulson capably guided us through it. Pearline Foster shared her time, personnel, and an all-important photocopier. At the National Archives in College Park, MD, Allen Lewis graciously provided access to their excellent facilities.

Numerous individuals agreed to be interviewed for this publication. We would like to express our sincerest thanks to them and their spouses for helping guide us through the complex maze of names, projects, and places that had been shrouded in secrecy by the passing of nearly fifty years. Special thanks go to Athelstan and Kathy Spilhaus, Charles and Wilma Moore, Col. Albert and Jean Trakowski, Lt. Col. Sheridan and Mary Cavitt, and Maj. Irving Newton, USAF (Ret). Also sincerest thanks to Mrs. Emily Duffy and Mrs. Mildred Crary for sharing their recollections and photographs of their distinguished husbands.

We also put to good use the fine reference facilities at the Naval Research Laboratory in Washington, DC, and thank Eileen Pickenpugh, the Deputy Librarian, Murray Bradley, head of Research Reports Section, and Ralph Peterson, the Research Report Librarian, all of whom helped immeasurably to make our searches easier.

Our thanks go also to the men and women of the 913th Airlift Wing (AFRES) at Willow Grove ARS, PA, especially to Col. Richard Moss, the 913th Airlift Wing Commander, and Lt. Col. (Col. Select) Robert Hunter, the 913th Logistics Group Commander, for providing end-of-year assistance. And we are grateful to CMSgt. Michael Breitenbach, for sharing his very useful experiences and insights.

We are most grateful to the members of Air Force Publishing—Ray Del Villar, Linda Garmon, and Jack Fischer—who brought this publication into print, and to SRA Garrety Wood of the 11th Communication Squadron Photo Lab for excellent photo reproduction services.

In the course of researching and writing this report, numerous other individuals contributed to the success of the project. Among them were Col. Gerald Merritt; Director, Clinical Investigations and Life Sciences Division, Headquarters Air Force Medical Operating Agency, Bolling AFB, DC; John Jenkins, Freedom of Information Act Manager, USAF Phillips Laboratory, Kirtland AFB, NM; George Horn, Technical Publications Editor, Air Force Environmental Technical Applications Centers, Scott AFB, IL; Steve Dean, Computer Specialist, Office of the Secretary of the Air Force, Pentagon; George Cully, Historian, 81st Training Wing, Keesler AFB, MS; Gene Schreiner, Technical Publications Editor, USAF Rome Laboratory, Griffiss AFB, NY; MSgt. Al Mack, Historian, 49th Fighter Wing,

Rome Laboratory, Griffiss AFB, NY; MSgt. Al Mack, Historian, 49th Fighter Wing, Holloman AFB, NM; Lois Walker, Historian, Air Force Matériel Command, Wright-Patterson AFB, OH; TSgt. Donald Valentine, Administrative Specialist, 89th Airlift Wing, Andrews AFB, MD; Maj. David Thurston, Secretary of the Air Force Public Affairs Office; Dr. Saxson and Betsy Hudon of the University of Texas at Arlington Library; Col. Joseph Fletcher, USAF (Ret); Robert Todd; Frank Press; Vance Mitchell; Lt. Col. Joseph Rogan; Maj. Kevin Stubbs; SRA Donald Crissman; Francis Whedon; Richard Hassard; Joseph Worzel; John Peterson; Martin Koenig; Eileen Ulrich Farnochi; and the late Vivian Bushnell. To all, we extend our sincerest gratitude.

32

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“Mensuration Working Paper”
with Drawing and Photo
February 15, 1994

Mensuration Working Paper

TARGET NAME		ROSWELL, N.MX.			
IMAGE ID.		FWST(UTA) NEG. ENV. #2026, NEG #1		DATE RETURNED 26-JUL-94	
IMAGERY ANALYST		[REDACTED]		DIVISION	DOD
IMAGERY SCIENTIST		[REDACTED]		PHONE	703-693-2013
				PHONE	[REDACTED]

COMPARATOR	N/A	MEASUREMENTS		HOURS	
INTERGRAPH	MSB2	MEASUREMENTS	17	HOURS	7

SIGNATURE _____		DATE _____	
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STEREO	☐
TERRESTRIAL	☒
RUSH JOB	☒
Q-JOB	☐
IA ASSISTED	☐
CABLE/PUBLICATION ITEM	☐

MENSURATION RESULTS:

PHOTOGRAPH AND CAMERA INFORMATION:

GROUND PHOTOGRAPHS- FWST(UTA) NEG. ENV. #2026, NEG #1- #4. TAKEN JULY 8, 1947.

CAMERA TYPE- SPEED GRAPHIC (4" X 5" FORMAT)

NOMINAL FOCAL LENGTHS- 127mm, 135mm and 150mm(MOST COMMON).

THE FOCAL LENGTH CALCULATED FOR THE CAMERA USED TO TAKE PHOTOGRAPH NEG. #1 IS EQUAL TO 121mm.

ASSUMPTIONS:

BROWN WRAPPING PAPER ON FLOOR UNDER OBJECT OF INTEREST IS ASSUMED TO HAVE A WIDTH OF $35.5 \pm 3"$.
 RADIATOR ON LEFT SIDE OF THE PHOTOGRAPH IS ASSUMED TO HAVE A TOTAL HEIGHT OF $28 \pm 2"$.

MEASUREMENTS:

STICK MEASUREMENTS:

ID.	LENGTH		WIDTH	
	(M)	(IN)	(M)	(IN)
A	0.7	27.6"	0.01	0.4"
B	0.6	23.6"	0.01	0.4"
C	0.9	35.4"	0.02	0.8"
D	0.5	19.7"	—	—
E	0.5	19.7"	0.02	0.8"
F	0.4	15.7"	0.01	0.4"
G	0.4	15.7"	0.01	0.4"
H	0.6	23.6"	—	—
BASE BOARD	0.1	3.9"	—	—

NOTE: THE ACCURACY STATEMENT IS 10% OF THE REPORTED LENGTHS AND WIDTHS.



Radiator

Rug Edge

Brown Edge

.B

.A

.C

.E

.F

.D

.G

.H

7/25/94 DLS
MAP VIEW
NEG.#1 PHOTOGRAPH

rug edge

brown paper

B

A

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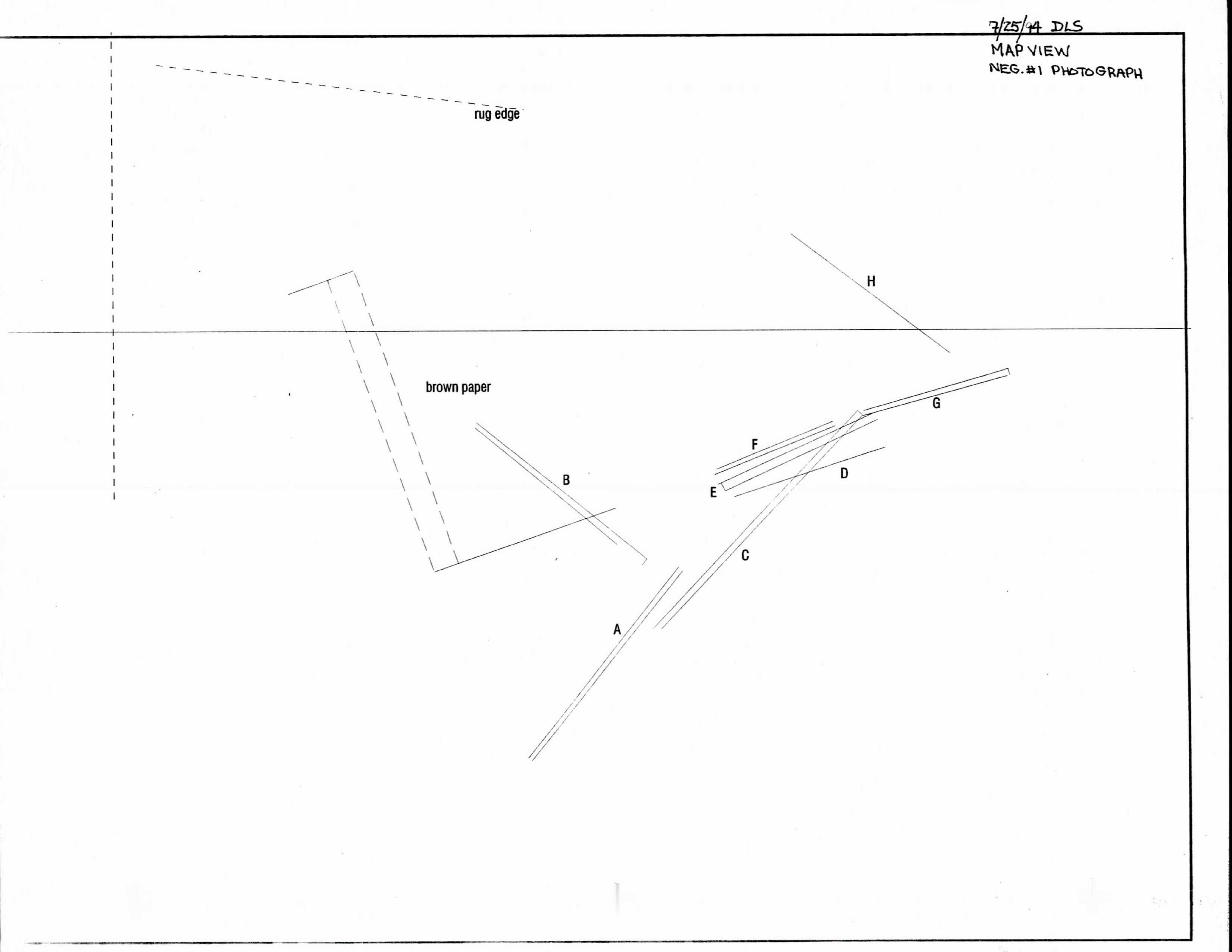
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33

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Synopsis of Balloon Research
Findings by
1st Lt James McAndrew

THE ROSWELL INCIDENT

On July 7, 1947, W.W. (Mac) Brazel, a rancher from approximately 75 miles northwest of Roswell, NM, contacted the local sheriff and reported that some metallic debris had come to rest on the ranch on which he worked near the town of Corona, NM. This was during the "UFO Wave of 1947," and he told the sheriff that he thought this debris may be part of a "flying disc."¹ The sheriff contacted Roswell (Army Air Field) AAF, which in turn sent intelligence officer, Maj Jesse Marcel, and two Counterintelligence Corps Agents, Capt Sheridan Cavitt and MSgt Lewis Rickett, to evaluate the debris. The officers collected a portion of the material and brought it back to Roswell AAF on the evening of July 7.² The following day, the Public Information Office released a statement saying that the Army Air Forces had recovered a flying disc. This press release was provided to local newspapers who sent it out to wire services. Meanwhile, Brig Gen Roger Ramey, Eighth Air Force Commander, ordered that the debris be flown to Eighth Air Force Headquarters at Fort Worth AAF, TX, for his personal inspection. Upon viewing the debris, he and his staff recognized parts which looked similar to a weather balloon. He then summoned the base weather officer, who identified the debris as the remnants of a weather balloon and its attached metallic radar target.³ General Ramey then invited the local press to view and take photographs of the materials and he declared the episode to be a misunderstanding (Atch 1).

The above summarizes the previously reported information of what happened on July 7 and 8, 1947. Before now, however, a larger portion of the story was never told. Recent research indicates that the debris recovered from the ranch on July 7, 1947, *was* a weather balloon—but it was not being used strictly for weather purposes; its real purpose was to carry classified payloads for a Top Secret US Army Air Forces project. The project's classified code name was MOGUL.

The current investigation discovered that an experimental balloon project was being conducted at nearby Alamogordo Army Airfield (now Holloman AFB, NM) during the summer of 1947.⁴ An examination of unclassified technical and progress reports prepared by the balloon project revealed that a highly classified program, Project MOGUL was the ultimate reason for the balloon experiments. Project MOGUL was classified Top Secret and carried a priority level of 1A.⁵ *It is Project MOGUL that provides the ultimate explanation for the "Roswell Incident."*

1. *Roswell Daily Record*, Jul 9, 1947, p. 1.

2. Intvw, Col Richard L. Weaver with Lt Col Sheridan Cavitt, USAF (Ret), May 24, 1994.

3. Intvw, Lt Col Joseph V. Rogan with Irving Newton, Jul 21, 1994.

4. Ltr, Lt Col Edward A. Doty to Mr David Bushnell, Mar 3, 1959.

5. Ltr, Brig Gen E. O'Donnell, Deputy Chief, Engineering Division, HQ AMC, to Commanding General, USAAF, subj: Change in Classification of MOGUL, Item 188-5, Jul 8, 1946.

PROJECT MOGUL

Project MOGUL was first conceived by Dr. Maurice Ewing of Columbia University, NY, and Woods Hole Oceanographic Institution, MA. Dr. Ewing had conducted considerable research for the Navy during World War II, studying, among other things, the “sound channel” in the ocean. He proved that explosions could be heard thousands of miles away with underwater microphones placed at a predetermined depth within the sound channel. He theorized that since sound waves generated by explosions could be carried by currents deep within the ocean, they might be similarly transmitted within a sound channel in the upper atmosphere. The military application of this theory was the long-range detection of sound waves generated by Soviet nuclear detonations and the acoustical signatures of ballistic missiles as they traversed the upper atmosphere. He presented his theory to General Carl Spaatz, Chief of Staff of the Army Air Forces, in the fall of 1945.⁶ The project was approved, and research was begun by the scientific research agency of the US Army Air Forces (USAAF), the Air Materiel Command (AMC), early in 1946. The project was assigned to HQ AMC, Engineering Division, Electronics Subdivision, which in turn assigned the project to AMC’s Watson Laboratories, Engineering Division, Applied Propagation Subdivision, located in Red Bank, NJ.

SCOPE

Project MOGUL initially focused on three areas of technology: (1) an expendable microphone, capable of detecting, at long range, low-frequency sound transmissions generated by explosions and missiles; (2) a means of telemetering these sounds to a ground or airborne receiver; and (3) a system from which to suspend the microphone and telemetering device in the upper atmosphere for an extended period of time. To meet these criteria, contracts were awarded by AMC to Columbia University (AMC contract no. W28-099-ac-82) for the acoustical equipment, and to New York University (NYU) for the development of constant-level balloons (AMC contract no. W28-099-ac-241). After the initial contracts were awarded, Project MOGUL branched out into many areas related to the geophysical properties of the upper atmosphere, including radiowave propagation, radar propagation, ionospheric physics, solar physics, terrestrial magnetism, meteorological physics, and weather forecasting. Considerable resources were devoted to Project MOGUL which included numerous bomber and transport aircraft and two oceangoing vessels. At one point the staff, exclusive of contractors, numbered over 100 persons. To accommodate this sensitive, high-priority project, facilities of the secluded Oakhurst Field Station of Watson Laboratories were used. Balloon operations associated with Project Mogul were conducted at various locations throughout the United States and the Pacific, the latter in reference to acoustical detection research associated with the Sandstone atomic tests at Eniwetok Atoll in April and May 1948.⁷

By December 1948, serious concerns had arisen regarding the feasibility of the project as first conceived. Even though the principle on which the project was based was

6. Rprt, Maurice Ewing for General Carl Spaatz, “Long Range Sound Transmission in the Atmosphere,” n.d.

7. Rprt, HQ Fitzwilliam Fwd, “Sonic Balloon Test Kwajaiein,” May 17, 1948 (hereafter “Sonic Balloon Test Kwajaiein”).

determined to be sound, questions concerning cost, security, and practicality were discussed that ultimately led to the disbandment of the project, and Project MOGUL as first conceived was never put into operational use. However, MOGUL did serve as the foundation for a comprehensive program in geophysical research from which the USAF and the scientific community have benefited to the present time. These benefits included constant-level balloon technology, first developed by NYU for Project MOGUL.

WATSON LABORATORIES

The organizational structure of Watson Laboratories Applied Propagation Subdivision, which was established primarily for MOGUL, as it appeared in January 1947, is shown in Attachment 2. Over the course of the project, MOGUL had three military project officers, or “chiefs”: Maj Robert T. Crane, spring 1946–July 1946; Col Marcellus Duffy, August 1946–January, 1947; and Capt Albert C. Trakowski, January 1947–May 1949. Major Crane had been personally recommended by Dr. Ewing, originator of the project, but by June of 1947, MOGUL had not met the expectations of HQ USAAF, and Colonel Duffy replaced Major Crane.⁸ Colonel Duffy was a respected, highly capable career Army Air Forces officer. During World War II, Colonel Duffy had reported directly to General Hap Arnold, Chief of Staff USAAF, as the Army Air Forces Liaison Officer to the US Army Signal Corps, with primary duties for securing meteorological equipment from the Army for use by the USAAF. Colonel Duffy had a reputation for accomplishing difficult assignments by getting the most out of his personnel—exactly what was desired by HQ USAAF to solve the numerous administrative and personnel problems that had arisen in Project MOGUL under Major Crane. In a short period, Colonel Duffy was able to make the necessary corrections and was reassigned to become the Assistant Chief, Electronics Plans Section, Electronics Subdivision, HQ AMC, at Wright Field, OH. Colonel Duffy also continued to monitor “the upper air research program” (i.e., Project MOGUL) in addition to his duties as the Assistant Chief of the Electronics Plans Section.⁹ The primary scientist for MOGUL was Dr. James Peoples, assisted by Albert P. Crary, the Field Operations Director. Both scientists had previous associations with Dr. Ewing: Dr. Peoples at Columbia, and A.P. Crary at Woods Hole. Both scientists were assigned to MOGUL for the entire length of the project.

NEW YORK UNIVERSITY “BALLOON GROUP”

From September 30, 1946, until December 31, 1950, the Research Division of the College of Engineering of NYU conducted research under contract for the Army Air Forces, in conjunction with Project MOGUL.¹⁰ The NYU “balloon group” was to develop and fly constant-level balloons while simultaneously developing telemetering equipment to transmit data obtained in the upper atmosphere.¹¹ Group members launched, tracked,

8. Memo, Brig Gen Tom C. Rives, Chief, Electronic Subdivision, Engineering Division, AMC, to Maj Gen Curtis LeMay, subj: Relief of Major Crane as Project Officer MOGUL and TORRID, Jun 18, 1946.

9. Memo, Maj Gen Curtis E. LeMay, Deputy Chief of Air Staff for Research and Development, to Maj Gen L.C. Craigie, Chief Engineering Division, AMC, Apr 16, 1947.

10. Research Division, College of Engineering, NYU, *Technical Report No. 93.03, Constant Level Balloons, Final Report*, Mar 1, 1951 (hereafter NYU, *Final Report*), p. 3.

11. Research Division, College of Engineering, NYU, *Technical Report 93-02, Constant Level Balloons*,

and recorded data only in regard to constant-level balloon flight and telemetering of information. They did not have access to observations and measurements that had military applications. MOGUL, in other words, was conducted as a compartmented, classified project in which participants knew only what they needed to know, and no more. Due to the compartmentation, balloon flights made by NYU were divided into two categories, "research" and "service."¹² Research flights tested balloon controls and telemetering systems and were fully reported in the unclassified NYU reports.¹³ A total of 110 research flights were flown during the contract. Service flights were flown at the direction of Watson Laboratory personnel, but the military purpose was Top Secret. These flights carried classified equipment, which could not be fully reported in the unclassified NYU documents. Further evidence of the exclusion of classified information from the reports is the lack of data for balloons flown in association with the Sandstone nuclear tests held in April and May of 1948.¹⁴ In recent interviews with former NYU personnel, Dr. Athelstan F. Spilhaus, NYU Director of Research, and Professor Charles B. Moore, NYU Constant-Level Balloon Project Engineer, stated that they were never informed of the classified name, MOGUL, nor did they ever have access to the scientific data that was obtained by the USAAF as a result of their efforts. In response to inquiries, professional or casual, project personnel simply said that they were engaged in balloon research.¹⁵

The first balloon launches associated with Project MOGUL were carried out at several locations on the east coast of the United States.¹⁶ However, unfavorable winds, conflicts with commercial air traffic, and the need to gather data on the V-2 flights currently being conducted at White Sands Proving Ground, NM, led the NYU group to conduct further tests from Alamogordo AAF.¹⁷ The NYU group would make three "field trips" during the summer of 1947 for test and evaluation, labeling them Alamogordo I, II, and III. The majority of the balloon flights over the next four years originated from Alamogordo AAF.

New York University, in accordance with contractual requirements, produced monthly progress reports, technical reports, and final reports detailing the various aspects of the balloon and telemetering research. In addition, Crary maintained a detailed journal of his work throughout his professional career to include the summer of 1947. The following discussion is based on these two documents and interviews with Moore, who was present on all three of the Alamogordo field trips, and, with Trakowski, who was present at the Alamogordo II and III field trips.

Sect 1, *General*, Nov 15, 1949, p. 5.

12. NYU, *Final Report*, p. 13.

13. Research Division, College of Engineering, NYU, *Technical Report No. 1, Constant Level Balloon*, Apr 1, 1948, Table VII, "Summary of NYU Constant-Level Balloon Flights" (hereafter NYU, *Technical Report No. 1*, Table VII); *ibid.*, *Technical Report No. 93.02, Constant Level Balloons*, Sect 3, *Summary of Flights*.

14. "Sonic Balloon Test Kwajaiein."

15. Athelstan F. Spilhaus, C.S. Schneider, C.B. Moore, "Controlled-Altitude Free Balloons," *Journal of Meteorology*, 5 (Aug 1948): 130-137.

16. NYU, *Technical Report No. 1*, Table VII.

17. Research Division, College of Engineering, NYU, *Progress Report No. 6, Constant Level Balloon*, Sect II, June 1947 (hereafter *Progress Report No. 6*, Sect II), p. 4.

NOTE: *Technical Report No. 1*, Table VII, "Summary of NYU Constant-Level Balloon Flights," and *Technical Report No. 93.02, Constant Level Balloons*, Section 3, "Summary of Flights," do not fully account for all balloons flown during the initial stages of the contract to include the Alamogordo I field trip. Absent from the reports are service flight nos. 2, 3, and 4. Flight no. 2 was flown on April 18, 1947, at Bethlehem, PA, in an attempt to obtain acoustical data from the explosion of 5,000 tons of TNT by the British on the German island of Helgoland.¹⁸ NYU flight no. 3 was flown on May 29, followed by NYU flight no. 4 on June 4. Both launched from Alamogordo AAF.

ALAMOGORDO I (May 28, 1947–June 7, 1947)

The first NYU "field trip" departed Olmstead Field, Middletown, PA, by C-47 for Alamogordo AAF on May 31, 1947, arriving on June 1, 1947.¹⁹ Present on this flight was C.B. Moore, NYU Project Engineer, Charles S. Schneider, NYU Project Director, and other supporting staff members from both NYU and Watson Laboratories. A.P. Crary, along with other personnel from Watson Laboratory, were already present in Alamogordo, but they did not conduct any balloon operations. During this time, Crary and several technicians detonated ground explosives, or "shots," for sound-wave generation purposes, on the nearby White Sands Proving Ground. These detonations were monitored by ground-based GR3 and GR8 sound ranging equipment at locations in New Mexico and West Texas.²⁰ On May 28, the advance party of the balloon group arrived by B-17.²¹ On May 29, the advance team made the first launch for Project MOGUL from Alamogordo (NYU flight no. 3). The equipment carried on this flight was identified as essentially the same as that carried on NYU flight no. 2 (Atch 3).²² NYU flight no. 4 was launched on June 4, with a configuration the same as on flight nos. 2 and 3. Crary's diary indicated that flight no. 4 consisted of a "cluster of (meteorological) balloons" and a "regular sonobuoy."²³ Presumably, flight no. 3 was configured the same.

The objective of this trip, so far as NYU was concerned, was to perfect the handling of large flight trains of meteorological balloons and to evaluate the operations of altitude controlling and telemetering devices.²⁴ Already established before the trips to Alamogordo was that the use of the standard, 350-gram meteorological balloons, constructed of neoprene, was, at best, a "stop gap" method of achieving constant-level flight.²⁵ Balloons most suitable for this type of work were made of polyethylene, a very thin, translucent plastic. These balloons, however, had just been developed, and, although the NYU group had contracted for some of them, the balloons had not been received until after the

18. Research Division, College of Engineering, NYU, *Special Report No. 1, Constant Level Balloon*, May 1947 (hereafter NYU, *Special Report No. 1*), p. 27.

19. Personal journal of Albert P. Crary, p. 13.

20. *Ibid.*, pp. 4–16.

21. *Ibid.*, p. 13.

22. NYU, *Progress Report No. 6*, Sect II, p. 5.

23. Crary personal journal, p. 12.

24. Research Division, College of Engineering, NYU, *Progress Report No. 7, Constant Level Balloon*, Sect II, Jul 1947 (hereafter NYU, *Progress Report No. 7*, Sect II), p. 5.

25. NYU, *Special Report No. 1*, p. 26.

group departed for Alamogordo.²⁶ For Watson Laboratory scientists Peoples and Crary, the purpose of this trip was to experiment with different types of equipment to collect and transmit sound waves in the upper atmosphere. Therefore, just as the "balloon group" was using meteorological balloons as a stopgap method in attaining constant-level flight, the Watson Laboratory scientists utilized an AN/CRT-1A Sonabuoy while awaiting the delivery of acoustical equipment specifically designed for Project MOGUL.²⁷ The NYU personnel developing the telemetering equipment experimented with components of the sonabuoy, which was cylindrical, nearly 3 feet long and 4 3/4 inches wide, and weighing 13 pounds (Atch 4). The sonabuoy contained both the acoustical pickups, known as hydrophones, and the means of telemetering the sounds by use of a FM transmitter, the T-1B/CRT-1.

Soon after arriving at Alamogordo AAF, a problem developed. Dr Peoples, Project Scientist, decided not to bring the radiosonde recorder (an AN/FMQ1 weighing approximately 500 pounds), due to the weight and space limitations of the B-17 aircraft originally scheduled to transport the equipment from Olmstead Field. Radiosondes were a widely used and accurate method of tracking weather balloons consisting of a transmitter, which was carried aloft by the balloon, and a ground-based receiver/recorder. Radiosondes, along with aircraft, were to be the primary method to track the Project MOGUL balloons.²⁸ Dr. Peoples, however, believed that the radar currently in place at Alamogordo for tracking V-2 firings would be sufficient for tracking the balloons trains. However, this radar did not work well and often lost contact with the balloon while it was still within visual range. Accordingly, Moore, the project engineer, experimented with an "unorthodox" method, in the absence of a radiosonde recorder. He tried to track the balloons using multiple radar targets.²⁹ A radar target was a multisided object, which, in appearance, resembles a box kite constructed of balsa wood and metallicized paper (Atch 5). Moore and his technicians conducted test flights, attempting to obtain a better radar return by attaching additional targets. They received satisfactory results when the number of targets was increased to between 3 and 5.³⁰ Interestingly, during July of 1948, a similar test would be made at Alamogordo AAF by another organization.³¹ This test confirmed Moore's theory that when targets were increased to at least three, satisfactory returns were received by the radar. This procedure, according to Moore, was employed on flight nos. 3 and 4, but it was only marginally successful. This prompted Moore and his associates to configure the two remaining flights of Alamogordo I, flights #5 and #6, with radiosonde transmitters.

For these two final flights, Moore devised a method of manually determining azimuth and elevation, in the absence of a radiosonde recorder, by counting clicks as pressure-

26. NYU, *Progress Report No. 7*, Sect II, p. 6.

27. Research Division, College of Engineering, NYU, *Progress Report No. 4, Radio Transmitting, Receiving and Recording System for Constant Level Balloon*, Sect I, Apr 2, 1947, p. 1.

28. Intvw, Col Jeffrey Butler and 1st Lt James McAndrew with Professor Charles B. Moore, Jun 8, 1994.

29. Moore intvw, Jun 8, 1994.

30. Ibid.

31. Rprt, Holloman AFB, "Progress Summary Report on U.S.A.F. Guided Missile Test Activities," Vol 1, Aug 1, 1948.

sensitive contacts closed. NYU Technical Report No. 1 shows two "interpretations" of the data which confirm that manual calculations were used. In regard to flight no. 5, it appears there was a typographical error in Technical Report No. 1, Table VII, for the time of launch which is erroneously listed as 1517 MST, contrary to figures 32 and 33 in Technical Report No.1 and Crary's diary (Atch 6). The correct time of launch for flight no. 5 appears to be 0516 MST. With the launching of flight no. 6 at approximately 0530 on June 7, the NYU group departed Alamogordo via a B-17 for Newark AAF, NJ. NYU flight nos. 1-6 are summarized below:

SUMMARY OF FLIGHTS 1-6

Flight no.	Date	Launch Site	Configuration	Landing Site
1	4/3/47	Bethlehem, PA	See NYU <i>Tech. Report</i> No. 1, Table VII	Sandy Hook, NJ
2	4/18/47	Bethlehem, PA	See Appendix NYU <i>Special Report</i> No. 1	Unknown
3	5/29/47	Alamogordo, NM	Same as flight no. 2*	Unknown
4	6/4/47	Alamogordo, NM	Same as flight no. 2*	Unknown
5	6/5/47	Alamogordo, NM	See NYU <i>Tech. Report</i> No. 1, Table VII	East of Roswell, NM
6	6/7/47	Alamogordo, NM	See NYU <i>Tech. Report</i> No. 1, Table VII	South of Highrolls, NM

* Depictions of flight nos. 3 and 4 are not provided in the NYU reports. According to NYU *Progress Report* No. 6, Section II, p. 5, the equipment to be used for the Alamogordo field trip in June was consistent with the depiction of flight no. 2. This information also concurred with Crary's partial description of flight no. 4 in his diary.

Note: An attempt to launch a balloon-train assembly which would have been NYU flight no. 3 was made on May 8, 1947, but due to strong winds, restraining lines failed before the acoustical payload was attached. Since the launch was unsuccessful, no flight number was assigned.

ALAMOGORDO II (June 27, 1947-July 8, 1947)

On the morning of June 28, 1947, personnel from NYU and Watson Laboratories arrived at Alamogordo AAF to resume balloon flights. Present during this field trip were Dr. Peoples, A.P. Crary, Captain Trakowski, C.B. Moore, and Charles Schneider. The objective during this trip was to experiment with the newly developed polyethylene balloons which replaced the neoprene meteorological balloons used on the previous field trip. Also tested was an improved aluminum ballast reservoir that had been developed to replace the plastic tubes used during the June field trip.³² Another improvement that resulted from the experiences in June was the presence of a radiosonde receiver/recorder for improved balloon tracking and plotting. This eliminated the need for radar "corner reflectors" on the balloon train since radar was not to be used as a primary method of tracking the flights. This is confirmed by Technical Report No. 1, Table VII, "Radiosonde

32. NYU, *Progress Report* No. 7, Sect II, p. 5.

Reception %," which indicates the use of the radiosonde recorder on all flights except for no. 7. Flight no. 7 was not recorded by radiosonde because the equipment was not operable.³³ Also Figures 36, 39, 42, and 44 in Technical Report No. 1, corresponding to the July flights, do not depict corner reflectors. All numbered flights (except for no. 9) flown during the July field trip were summarized in NYU Technical Report No 1, Table VII. Flight no. 9 appeared to have been launched on July 3.³⁴ On July 8, their work completed, 23 members of the combined NYU and Watson Laboratory group boarded a C-54 aircraft at 1030 AM and returned to the east coast.³⁵

Based on the above, it appeared likely that the debris found by the rancher and was subsequently identified as a "flying disc" by personnel from Roswell AAF was, with a great degree of certainty, MOGUL flight no. 4, launched on June 4, 1947. This conclusion was based on the following:

1. Descriptions of the debris provided by Brazel, Cavitt, Crary's diary, and the photos of the material displayed in General Ramey's office. These materials were consistent with the components of a MOGUL service flight, with neoprene balloons, parchment parachutes, plastic ballast tubes, corner reflectors, a sonabuoy, and a black electronics box that housed the pressure cutoff switch (Atch 3).
2. According to Brazel's July 8 statement, the debris was recovered on June 14, obviously eliminating any balloons launched in July.
3. Only two flights launched in June were unaccounted for, i.e., flight nos. 3 and 4. Flight no. 3, most likely would not have had the "unorthodox" configuration of corner reflectors devised by Moore, who did not arrive until June 1, three days after flight no. 3 was launched.

On July 7, as the NYU group members were winding down their work and preparing to return to New York City, a train of events began to unfold at Roswell AAF, 60 miles away. Roswell AAF was home of the 509th Bomb Group of the Strategic Air Command's Eighth Air Force, the only unit in the world capable of delivering nuclear weapons. It now appears that the debris from MOGUL flight no. 4 had come to earth on the plains east of the Sacramento Mountains, about 70 miles from the launch point at Alamogordo AAF (Atch 7). The fact it descended there was not unusual. Over the course of Project MOGUL, several balloons had landed and been recovered from that area. In fact, in August 1947, the NYU group had to receive special permission from the Civil Aeronautics Administration to continue to launch balloons from Alamogordo AAF since "balloons have been descending outside of the area [White Sands Proving Ground] in the vicinity of Roswell, New Mexico."³⁶ According to the sole living participant in the recovery, Sheridan Cavitt, he, Major Marcel, and MSgt William Rickett gathered some of the material, which appeared to resemble "bamboo type square sticks, one quarter to one half inch square," that was "very light"—reflecting material—and a "black box, like

33. Crary personal journal, p. 15.

34. Ibid.

35. Ibid., p. 16.

36. NYU, *Technical Report No. 1*, Table VII, p. 43.

a weather instrument.” Cavitt believed this material to be consistent with what he knew to be a weather balloon. This debris, would soon become, for a short time, the focus of national and even worldwide attention when it was thought to be a “flying disc.”

On July 8, the same day that the NYU/Watson Laboratory group departed Alamogordo, the Public Information Office of Roswell AAF announced the recovery of a “flying disc” and that it would be flown to Fort Worth AAF for further examination. How could experienced military personnel have confused a weather balloon for a “flying disc”? The answer was this was not an ordinary “weather balloon.” Typical weather balloons employed a single, 350-gram neoprene balloon and a radiosonde for measuring temperature, atmospheric pressure, and humidity, housed in a cardboard box. If it was to be tracked by radar for wind-speed measurement, a single corner reflector was added (Atch 8). The balloon that was found on the Foster Ranch consisted of as many as 23 350-gram balloons spaced at 20 foot intervals, several radar targets (3 to 5), plastic ballast tubes, parchment parachutes, a black “cutoff” box containing portions of a weather instrument, and a sonabuoy (Atch 3). After striking the ground, the radar reflectors, constructed of very light materials for minimum weight, would tear and break apart, spreading out over a large area when pulled across the ground by balloons that still possessed some buoyancy. It should also be understood that the term “flying disc” was not at this time synonymous with “space ship,” It denoted a disc-shaped flying object of unknown (or suspected Soviet) origin.

Before the announcement was made, the “disc” was flown to Fort Worth AAF, at the direction of Brig Gen Roger Ramey, Commander, Eighth Air Force. General Ramey personally inspected the “disc,” became skeptical, and summoned the base weather officer, Warrant Officer Irving Newton, to make an identification. Newton positively identified the debris as the remnants of a balloon and RAWIN target.³⁷ With this identification, the incident officially closed.

THE “COVER STORY”

From research, it appears that the wreckage displayed on July 8 consisted of unclassified components of a MOGUL balloon assembly. Possibly withheld, if it was indeed recovered, was the AN/CRT-1 Sonabuoy, which could have compromised Project MOGUL. Although the Sonabuoy was not itself classified, its association with a balloon would have exposed a specific military purpose, an obvious violation of project classification guidelines (Atch 9). A device described in “crashed disc” publications as “a giant thermos jug” was allegedly transported from Fort Worth AAF to Wright Field.³⁸ This description is consistent with the appearance of an AN/CRT-1 Sonabuoy such as was used on flight no. 4 (Atch 4). At some point General Ramey decided to forward the material to Wright Field, home of AMC, the appropriate agency to identify one of its own research devices or a device of unknown origin. If the debris was determined to be from an unknown source, the AMC, T-2, Intelligence or Analysis Division, would

37. Rawin is short for radar wind, a technique in which a single corner reflector is towed aloft by a single neoprene balloon to measure wind speed by radar.

38. Kevin Randall and Donald Schmitt, *UFO Crash at Roswell* (New York, 1991), p. 103.

conduct scientific and/or intelligence analysis in an attempt to discover its origin. But since the balloons, reflectors, and Sonabuoy were from an AMC research project, the debris was forwarded to the appropriate division or subdivision, in this case the Electronics Subdivision of the Engineering Division. There, it was identified by Colonel Duffy, under whose purview Project MOGUL operated. Colonel Duffy, a former project officer of MOGUL with specific directions to "continue to monitor upper air programs," was the appropriate headquarters officer to make an identification, which he apparently did. According to Captain (now Colonel) Trakowski, the officer who succeeded Colonel Duffy as project officer on MOGUL, after returning from the Alamogordo II field trip, Colonel Duffy contacted him by phone at Watson Laboratories and informed him that the "stuff you've been launching at Alamogordo," had been sent to him for identification. He described the debris to Captain Trakowski, and Trakowski agreed that it was part of his project (MOGUL).³⁹

Another occurrence sometimes said to "prove" that General Ramey was part of a cover story is that portions of the debris were flown to Andrews AAF, MD. Andrews would have been a probable location to send the debris since it had components of weather observation equipment. Andrews AAF was headquarters of the Army Air Forces Weather Service. It is also interesting to note that the commanding general of the Weather Service, Brig Gen Donald N. Yates, was quoted in wire service newspaper articles on July 9, providing his opinion of the incident. Additionally, in 1949, General Yates received a full briefing of the projects, including constant-level balloons, that made up Project MOGUL.⁴⁰ While crashed disc proponents claim that General Ramey ordered a "colonel courier" to transport portions of the debris in a briefcase handcuffed to his wrist for the inspection of his superior, Maj Gen Clement McMullen, Deputy Commander of Strategic Air Command, it is more likely that any forwarding of such debris was another attempt to identify the research agency to which it belonged. If it did go to General McMullen, it would not have been difficult for him to have obtained the opinion of the Weather Service, since SAC and the Weather Service were located in the same building (no. 1535) at Andrews AAF.

"HIEROGLYPHICS"

One of the most puzzling aspects of the reports that a "UFO" crashed near Corona in 1947 were the later descriptions of "hieroglyphic-like" characters by seemingly reliable, firsthand witnesses. Research has revealed that the debris found on the ranch and displayed in General Ramey's office probably did have strange characters. These, however, were not hieroglyphics, but figures printed on the pinkish-purple tape used to construct the radar targets used by the NYU group.

The witnesses have recalled small pink/purple "flowers" that appeared to be some sort of writing that couldn't be deciphered. These figures were printed on tape that sealed the seams of the of the radar target. The radar targets, sometimes called corner reflectors,

39. Intvw, Col Jeffrey Butler and 1st Lt James McAndrew with Col Albert C. Trakowski, USAF (Ret), Jun 29, 1994, p. 4.

40. Rprt, Cambridge Field Sta, AMC, "Review of Air Materiel Command Geophysical Activities by Brigadier General D.N. Yates, and Staff, of the Air Weather Service," Feb 10, 1949.

had been manufactured during or shortly after World War II, and due to shortages, the manufacturer, a toy company, used whatever resources were available. This toy company used plastic tape with pink/purple flowers and geometric designs in the construction of its toys and, in a time of shortage, used it on the government contract for the corner reflectors. A depiction of these figures, as described by C.B. Moore, is shown in Attachment 10.

Allegations have also been made that the debris displayed to the press on July 8 and subsequently photographed was not the original wreckage; i.e., a switch had occurred sometime after the debris left Roswell AAF. However, statements made by Moore and Trakowski attested that the corner reflectors they launched during that period had the same flowers and figures that were later reported by Marcel, Cavitt, and Brazel as being on the debris found on the Foster ranch in Corona. In fact, Trakowski distinctly remembered the figures on the tape because, when the targets first were produced, much fanfare was made over the use of a toy manufacturer for production. He related that a fellow USAAF officer, John E. Peterson, monitored the procurement of the targets and “thought it was the biggest joke in the world that they had to go to a toy manufacturer” to make the radar targets and an “even a bigger joke when . . . the reflecting material on the balsa frames was some kind of a pinkish purple tape with hearts and flowers designs on it.”⁴¹ Furthermore, the Fort Worth Army Airfield Weather Officer, Irving Newton, who was called in to identify the wreckage, also remembers the purple/pink marks. Newton stated that when he was called to General Ramey’s office he remembers meeting Marcel, who attempted to convince him that the wreckage on the floor of the office was a crashed “flying disc.” Newton, having seen many weather balloons and targets, positively identified the debris as a weather device.⁴² In short, descriptions of the wreckage found on the ranch near Corona and of the wreckage displayed in General Ramey’s office are entirely consistent with each other.

THE REAL COVER STORY

On July 10, 1947, a newspaper article appeared in the *Alamogordo Daily News* displaying for the press the devices, neoprene balloons, and corner reflectors which had been misidentified as the “flying disc” two days earlier at Roswell AAF (Atch 11). The photographs and accompanying article quoted Maj Wilbur D. Pritchard, a Watson Laboratory Project Officer (not assigned to MOGUL) stationed at Alamogordo AAF. This article appeared to have been an attempt to deflect attention from the Top Secret MOGUL project by publicly displaying a portion of the equipment and offering misleading information. If there was a “cover story” involved in this incident, it is this article, not the actions or statements of Ramey.

The article in the *Alamogordo Daily News* stated that the balloons and radar targets had been used for the last fifteen months for the training of long-range radar personnel and the gathering of meteorological data. The article lists four officers—Maj W.D. Pritchard, Lieut S.W. Seigel, Capt L.H. Dyvad, and Maj C.W. Mangum—as being involved with the

41. Trakowski intvw, Jun 29, 1994.

42. Newton intvw, Jul 21, 1994.

balloon project, which was false. Moore and Trakowski could not recall any of the officers in the photograph, with the exception of Dyvad, whom Moore identified as a pilot who coordinated radar activities.⁴³ Additionally, some of the details discussed (balloon sighting in Colorado, tracking by B-17s, recovery of equipment, launching balloons at 5–6 AM, and balloon altitudes of 30,000–40,000 feet) relate directly to the NYU balloon project, indicating that the four officers had detailed knowledge of MOGUL.⁴⁴ Moore's unorthodox technique of employing several balloons and several radar targets was shown in one of the photographs. Other techniques unique to Moore, including the boiling of balloons before launch (which he personally developed during World War II) and a stepladder used to launch balloons, could not all have coincidentally been used by other organizations.⁴⁵

The details may have been provided to the radar officers by Crary, Project MOGUL Field Operations Director, who did not depart by C-54 with the rest of the NYU/Watson Laboratory group on July 8, but who later left by car on July 9, the day the staged launch took place. Additionally, three of Crary's staff, Don Reynolds, Sol Oliva, and Bill Edmonston, resided permanently in Alamogordo. It was apparent from Crary's diary that he had worked very closely with Major Pritchard and reported to him on occasion (twelve documented meetings from December 1946–April 1947). One instance, on April 7, 1947, Crary gave Pritchard a "progress report for MOGUL project to date," indicating that Major Pritchard had access to MOGUL information.⁴⁶ Another statement which appeared to confirm a cover story appeared in the caption below the balloon picture and described a typewritten tag stapled to the target identifying it as having come from Alamogordo AAF. Moore believed this not to be true because any equipment found was not to be associated with the USAAF, only with NYU; therefore flights carried "return to" tags identifying NYU as the responsible agency.⁴⁷

CONCLUSION

Many of the claims surrounding the events of July 1947 could be neither proved nor disproved. Attempts were not made to investigate every allegation, but rather to start with what was known and work toward the unknown. To complicate the situation, events described here took place nearly 50 years ago and were highly classified. This Top Secret project appeared to have utilized the concept of compartmentalization very well. Interviews with individuals and review of documents of organizations revealed that the ultimate objective of the work, or even the name of the project, in many instances was not known. It was unlikely, therefore, that personnel from Roswell AAF, even though they possessed the appropriate clearances, would have known about project MOGUL. In fact, when the NYU/AMC group returned to Alamogordo in September, their first trip since the "incident" occurred, one of the first activities of the project scientists,

43. Moore intvw, Jun 8, 1994.

44. NYU, *Technical Report No. 1*, Table VII.

45. Moore intvw, Jun 8, 1994.

46. Crary personal journal, p. 10.

47. Moore intvw, Jun 8, 1994; Research Division, College of Engineering, NYU, *Technical Report No. 93.02, Constant Level Balloons*, Sect 2, *Operations*, Jan 31, 1949, pp. 36–38.

Peoples and Crary, who were accompanied by Major Pritchard and Captain Dyvad, was to brief the commanding officer of Alamogordo AAF and the 509th Bomb Group Operations Officer, Lt Col Joseph Briley, on MOGUL.⁴⁸

When the civilians and personnel from Roswell AAF (Marcel, Cavitt, and Rickett) “stumbled” upon the highly classified project and collected the debris, no one at Roswell had a “need to know” about information concerning MOGUL. This fact, along with the initial misidentification and subsequent rumors that the “capture” of a “flying disc” occurred, ultimately left many people with unanswered questions that have endured to this day.

JAMES McANDREW, 1st Lt, USAFR
Declassification and Review Officer
SAF/AAZD

Attachments:

1. 4 Photographs of Balloon Debris
2. Organizational Chart—Watson Laboratories
3. Drawing—New York University Flight No. 2
4. 2 Depictions of AN/CRT-1 Sonabuoy
5. Drawing of Corner Reflector
6. New York University *Technical Report No. 1*, Table VII
7. Map of New Mexico
8. Typical Employment of Weather Balloon and Corner Reflector
9. Project MOGUL Classification Letter
10. Drawing of “Hieroglyphics” by Prof. C.B. Moore
11. *Alamogordo Daily News* Article

48. Combined Hist, 509th Bomb Grp and Roswell AAF, Sep 1–30, 1947, p. 79; Untranscribed journal of Albert P. Crary, p. 64.



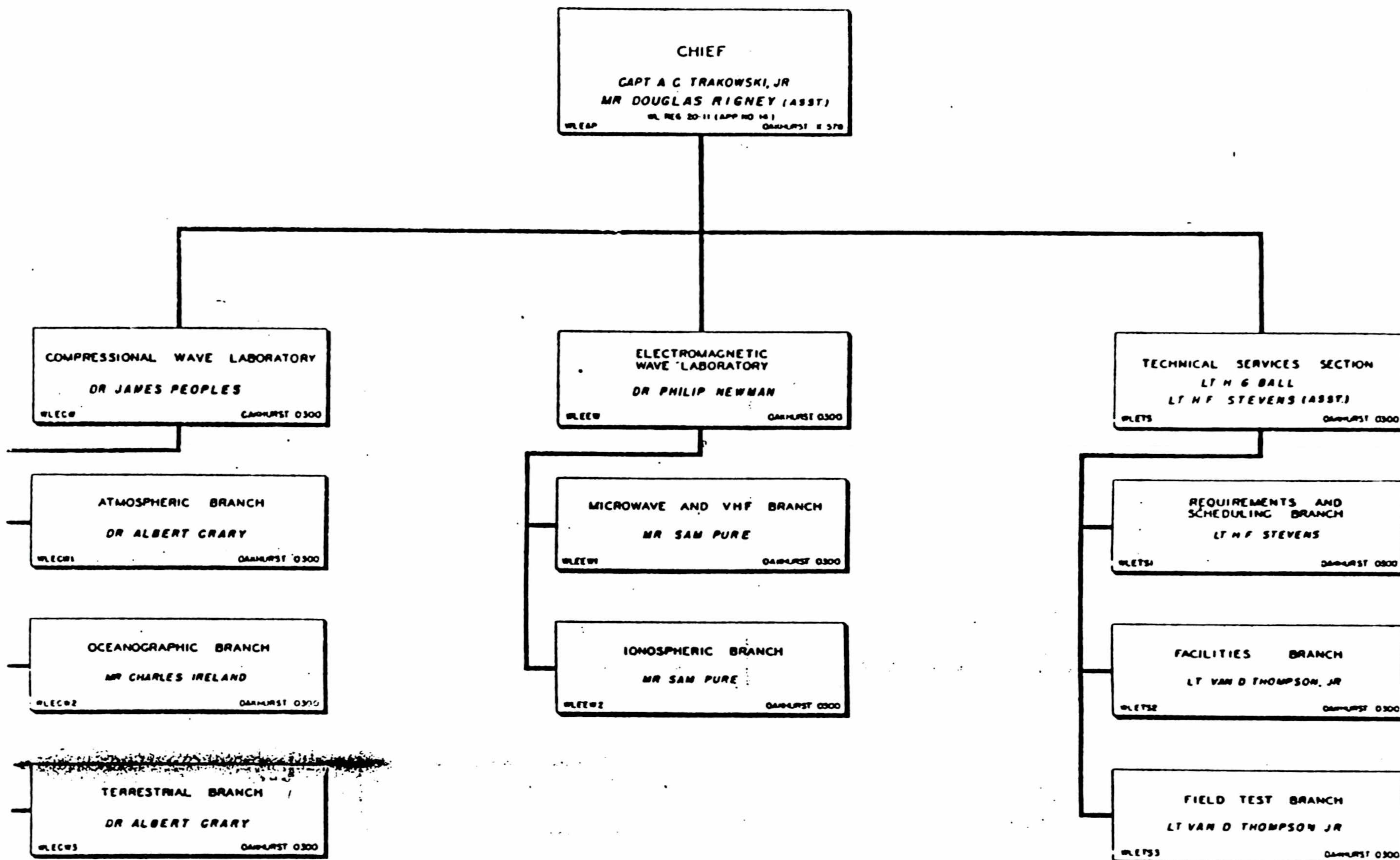


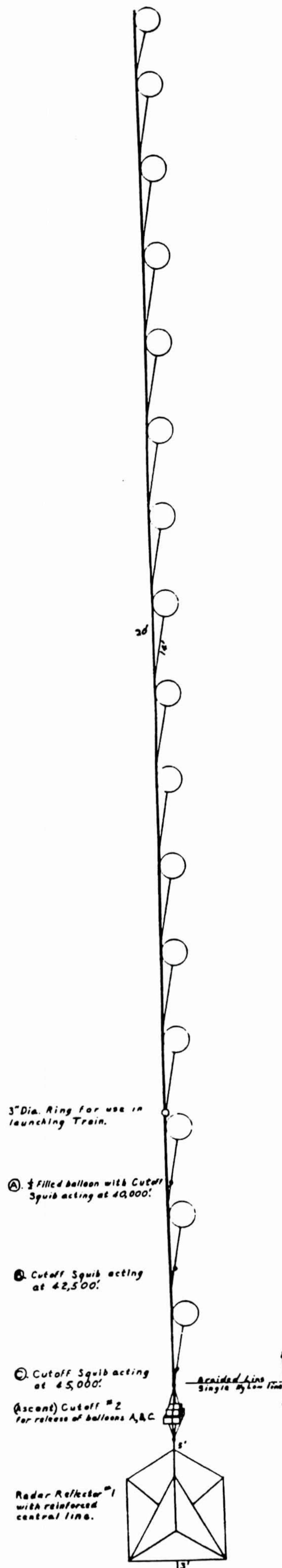
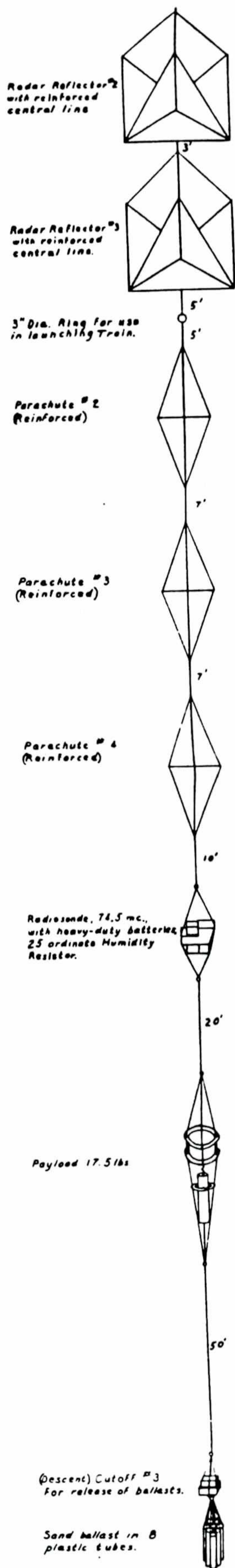




APPLIED PROPAGATION SUBDIVISION

AIR MATERIAL COMMAND
WATSON LABORATORIES
20 JAN 1947

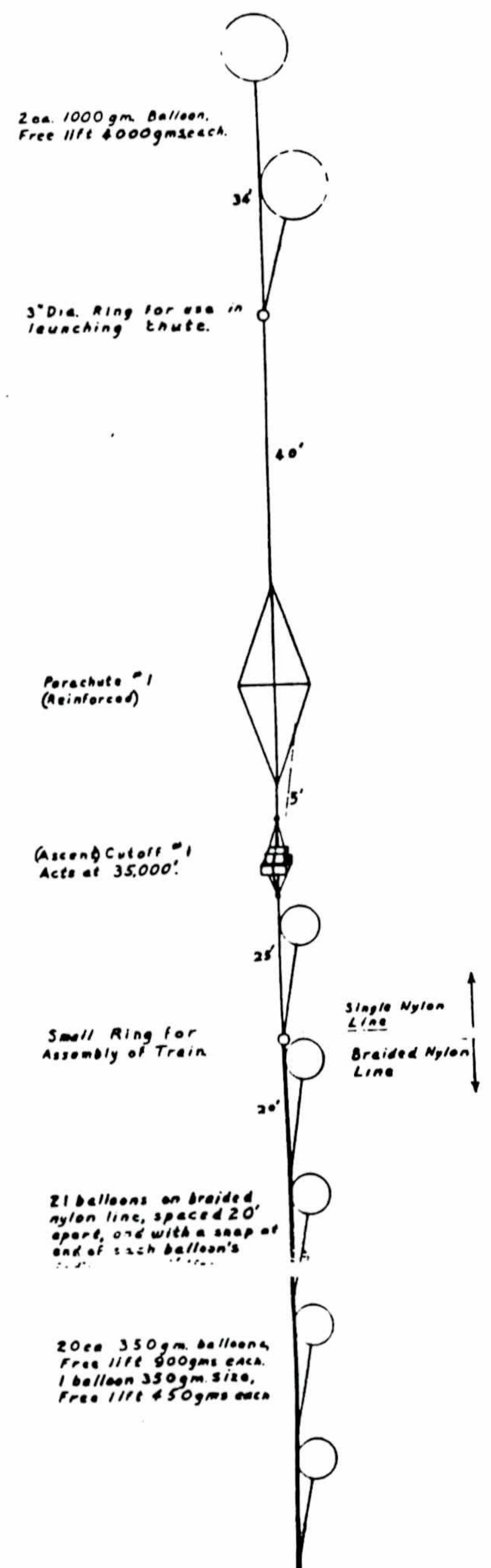


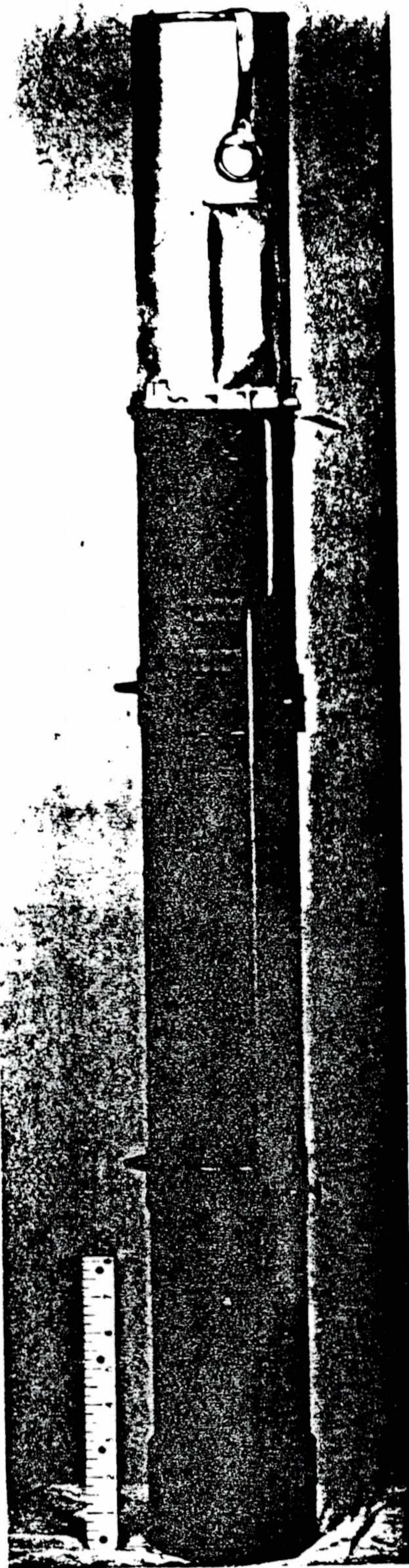


TRAIN FOR CLUSTER FLIGHT NO.2 TO BE FLOWN AT BETHLEHEM, PENNSYLVANIA

SCALE: BALLOONS AND ALL LINES — 1" = 15' 0"
ALL EQUIPMENT — 1" = 2' 0"

TOP





REDESIGN - EXPENDABLE RADIO SONO BUOY
FULLY ASSEMBLED

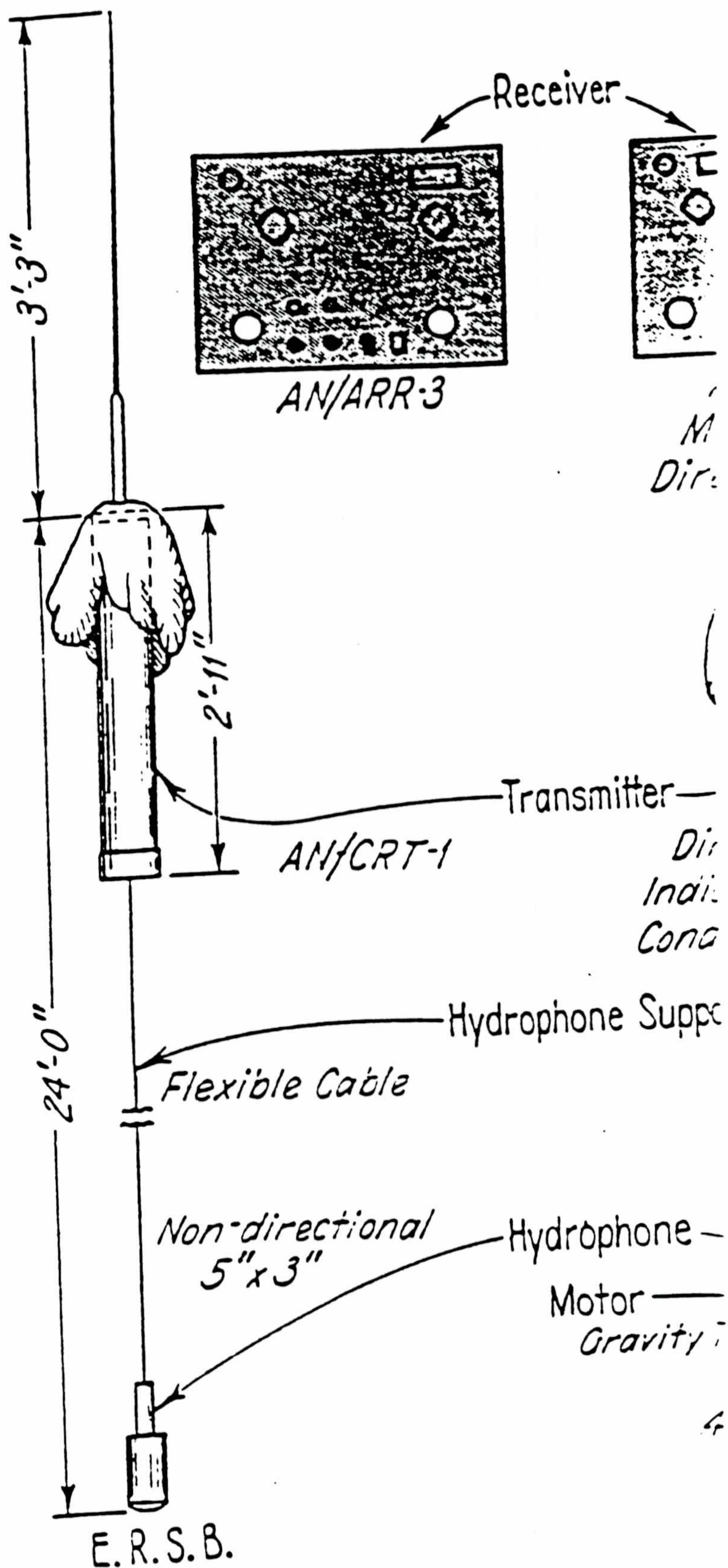
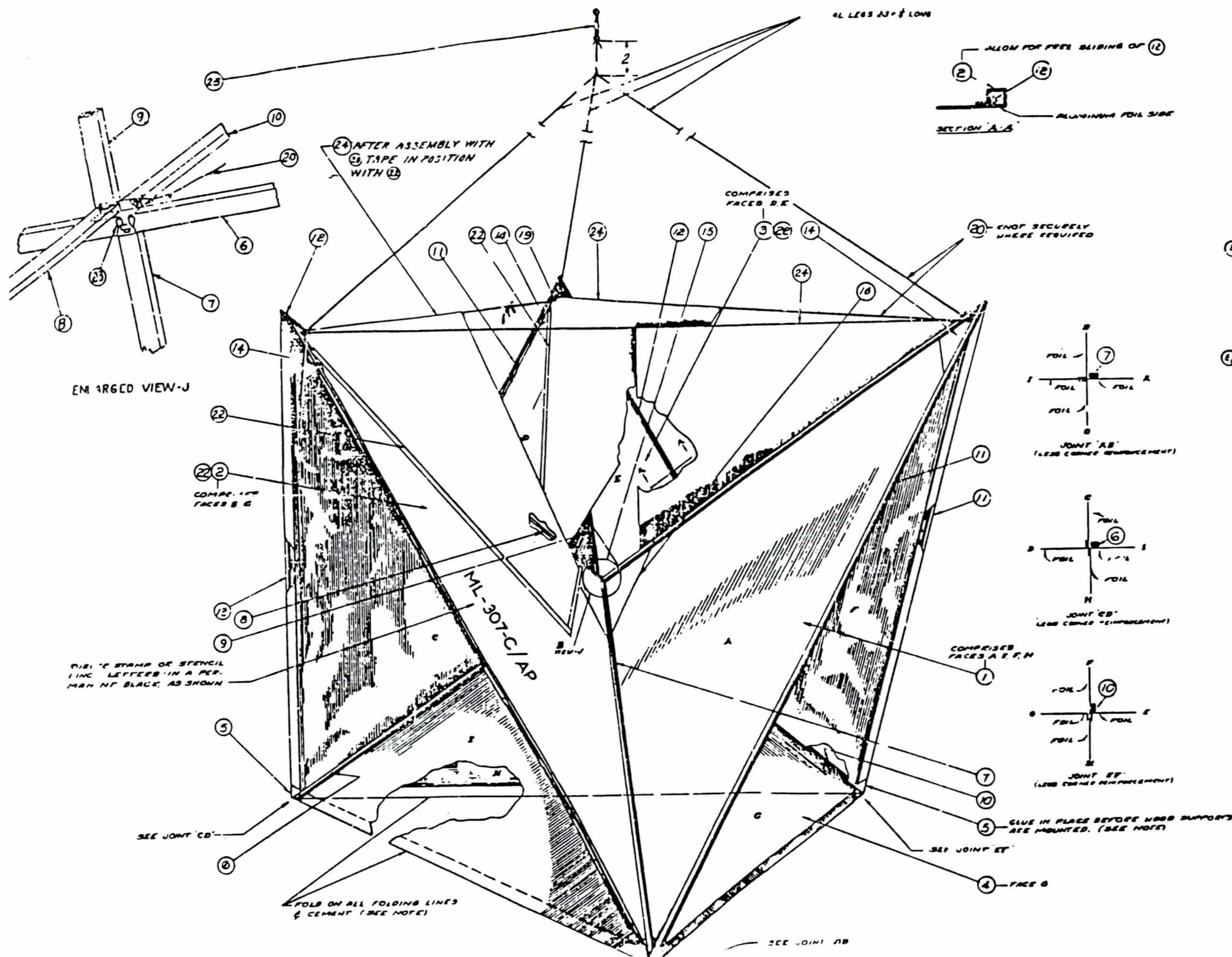


Figure 1—Comparison of nondirect:



REV	DESCRIPTION	DATE
1	REVISED & REDESIGNED - IN TITLE "ML-307C/AD"	
2	REDESIGNED & REDESIGNED - IN TITLE "ML-307C/AD"	
3	REDESIGNED & REDESIGNED - IN TITLE "ML-307C/AD"	
4	REDESIGNED & REDESIGNED - IN TITLE "ML-307C/AD"	
5	REDESIGNED & REDESIGNED - IN TITLE "ML-307C/AD"	
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25	REDESIGNED & REDESIGNED - IN TITLE "ML-307C/AD"	

(19) SHALL BE CYCLET 10-042 AS MADE BY E. S. BROWN CO. OF NEW YORK, N.Y. OR EQUAL.

(20) SHALL BE TYPE I, CLASS 1, PER SPEC CCC.

(21) SHALL BE 10-042 AS MADE BY E. S. BROWN CO. OF NEW YORK, N.Y. OR EQUAL.

(22) SHALL BE SCOTCH ACETATE FILM TYPE 10-042 AS MADE BY MINNESOTA MINING & MFG. CO. OF MINN. OR EQUAL.

(23) BOND ALL JOINTS SHOWN ON ASSEMBLY IN CEMENT. GENERAL PURPOSE. SYNTHETIC SPEC. MIL-C-4003.

(24) SHALL BE TYPE "TAN-371" AS MADE BY SIMON CO. NEW YORK, N.Y. OR EQUAL.

(25) SHALL BE "TAN-371" TYPE "TAN-371" AS MADE BY SIMON CO. NEW YORK, N.Y. OR EQUAL.

(26) THERE SHALL BE NO FOIL-TO-FOIL JOINTS.

TOLERANCES FOR DIMENSIONS ON ASS. DRAWING SHALL BE ±2 UNLESS OTHERWISE SPECIFIED AND SHALL BE SUCH THAT ALL PARTS OF THE ASSEMBLY WILL FIT TOGETHER IN A PROPER MANNER.

ITEM	DESCRIPTION	QUANTITY	REMARKS
1	SHIELD	25	
2	FACE	25	
3	BRACKET	25	
4	ADHESIVE TAPE	SEE NOTE 1	
5	WIRE TIE	25	
6	CYCLET	25	
7	REINFORCEMENT	25	
8	REINFORCEMENT	25	
9	REINFORCEMENT	25	
10	BRACE	25	
11	BRACE	25	
12	BRACE	25	
13	BRACE	25	
14	BRACE	25	
15	BRACE	25	
16	BRACE	25	
17	BRACE	25	
18	BRACE	25	
19	CORNER REINFORCE	25	
20	SHEET	25	
21	SHEET	25	
22	SHEET	25	
23	SHEET	25	
24	SHEET	25	
25	SHEET	25	

PLOT BALLOON TARGET ML-307C/AD ASSEMBLY

REV	DESCRIPTION	DATE
1	REVISED & REDESIGNED - IN TITLE "ML-307C/AD"	
2	REVISED & REDESIGNED - IN TITLE "ML-307C/AD"	
3	REVISED & REDESIGNED - IN TITLE "ML-307C/AD"	
4	REVISED & REDESIGNED - IN TITLE "ML-307C/AD"	
5	REVISED & REDESIGNED - IN TITLE "ML-307C/AD"	
6	REVISED & REDESIGNED - IN TITLE "ML-307C/AD"	
7	REVISED & REDESIGNED - IN TITLE "ML-307C/AD"	
8	REVISED & REDESIGNED - IN TITLE "ML-307C/AD"	
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12	REVISED & REDESIGNED - IN TITLE "ML-307C/AD"	
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15	REVISED & REDESIGNED - IN TITLE "ML-307C/AD"	
16	REVISED & REDESIGNED - IN TITLE "ML-307C/AD"	
17	REVISED & REDESIGNED - IN TITLE "ML-307C/AD"	
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19	REVISED & REDESIGNED - IN TITLE "ML-307C/AD"	
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24	REVISED & REDESIGNED - IN TITLE "ML-307C/AD"	
25	REVISED & REDESIGNED - IN TITLE "ML-307C/AD"	

TABLE VII

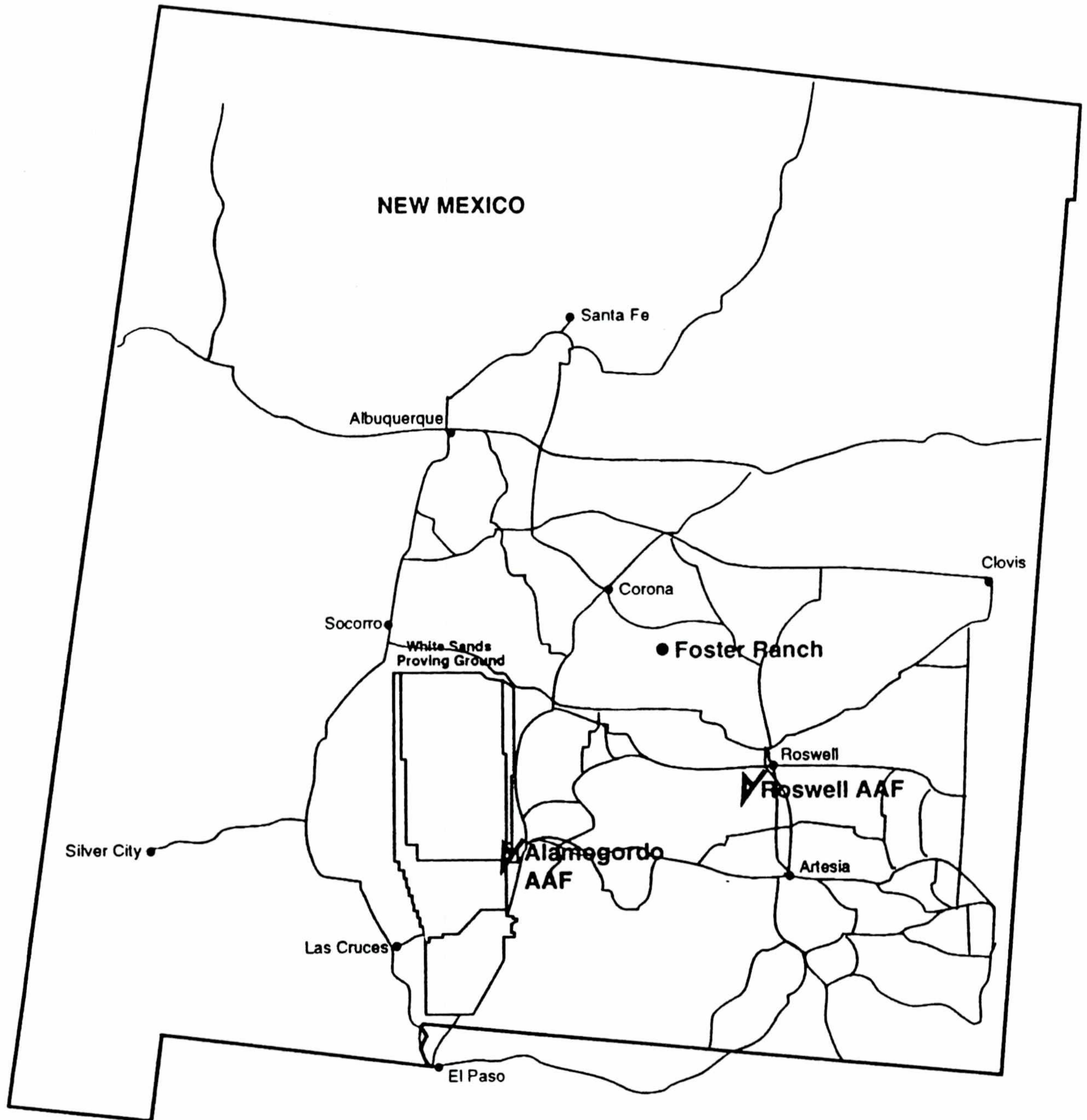
SUMMARY OF NYU CONSTANT-LEVEL BALLOON FLIGHTS

FLIGHT NUMBER	DATE AND RELEASE TIME	LAUNCHING SITE	DESCRIPTION OF BALLOONS	BALLOON WEIGHT	DESCRIPTION OF RADIOSONDE	TOTAL WEIGHT ON BALLOON INCLUDING BALLAST	DESCRIPTION OF ALTITUDE CONTROL	BALLAST WEIGHT	FREE LIFT	BALLOON LIFT	RADIOSONDE RECEPTION %	TRACKING %	AIRCRAFT OBSERVATION %	FLIGHT DURATION	0. TIME CONSTANT	MAXIMUM CONSTANT ALTITUDE MSL	RECOVERY LAND-ING SITE	CRITIQUE
A	20 Nov. 1946 1430 AST	NYU, N.Y.	2 - 350 gram meteorological	0.7 kg	72.2 mc Radiosonde	1.8 kg	None	0	Not known	Not known	80%	0%	0%	70 min.	4 min. $\pm$ 1000'	Max. 37000' Const. 37000'	OK	Balloon balancing load. Free lift from 350 gram meteorological balloons. Successful cutting free of lifter balloons. Balloon did not level off.
B	16 Dec. 1946 1219 EST	NYU, N.Y.	2 - 350 gram meteorological	0.7 kg	72.2 mc Radiosonde	1.8 kg	None	0	Not known	Not known	80%	Theodo-lite 50%	0%	31 min.	6 min. $\pm$ 1000'	Max. 18000' Const. 18000'	OK	Balloon balancing load. Free lift from 350 gram meteorological balloons. Successful cutting free of lifter balloons. Balloon did not level off.
1	3 April 1947 1412 AST	Bethlehem Pennsylvania	14 - 350 gram meteorological balloons. Long cosmic ray train	4.9 kg	72.2 mc Radiosonde Sand ballast	13.0 kg	3 cans of ballast to be dropped on descent	6.8 kg	Not known	Not known	60% with recorder 50% without recorder	Theodo-lite 66%	0%	119 min.	None	Max. 46000' Const. 46000'	OK	Failure due to poor rigging, poor launching technique. 8 lifter balloons 12 main balloons. Train rose until some balloons burst then descended rapidly.
2	5 June 1947 1517 MST	Alamogordo New Mexico	29 - 350 gram meteorological balloons. Long cosmic ray train	10.2 kg	72.2 mc Radiosonde Data gear Sand ballast Liquid ballast	26.4 kg	Balloons to cut off above 40000' 5 kg sand and 5 kg liquid to fall under 32000'	10.0 kg	9.9 kg	36.3 kg	100% without recorder	Theodo-lite 90%	90% B-17	348 min.	30 min. $\pm$ 200'	Max. 50000' Const. 51000'	100% E. of Roswell N. M.	First successful flight carrying a heavy load. 3 lifter balloons, 26 main balloons.
3	7 June 1947 0509 MST	Alamogordo New Mexico	28 - 350 gram meteorological balloons. Long cosmic ray train	9.8 kg	74.5 mc Radiosonde. 69.3 mc transmitter. Ballast assembly	28.3 kg	Balloons to cut off above 40000' 5 kg sand and 5 kg liquid to fall under 32000'	10 kg	1.9 kg	30.2 kg	90% without recorder	Theodo-lite 90%	40% B-17	164 min.	None	Max. 78000' Const. 78000'	90%	Flight unsuccessful. Altitude control damaged on launching. 4 lifter balloons, 24 main balloons.
4	8 July 1947 0521 MST	Alamogordo New Mexico	20 - 350 gram meteorological balloons in 2 Helios clusters	9.0 kg	74.5 mc Radiosonde Ballast assembly	25.7 kg	4 over inflated balloons. 10 kg lead shot to fall under 34000'	10 kg	10.8 kg	34.8 kg	60% without recorder	Theodo-lite 100%	100% C-54	418 min.	147 min. $\pm$ 5000'	Max. 48500' Const. 35000'	1% (1 balloon) stuck	Best flight though possible with flabby neoprene balloons. 4 lifter balloons, 16 main balloons.
5	3 July 1947 0303 MST	Alamogordo New Mexico	10 General Mills 7' .001" polyethylene	4.4 kg	74.5 mc Radiosonde Ballast assembly	16.7 kg	Dribbler, compass fluid Fixed leak 140 gm/hr	3 kg	3.5 kg	20.8 kg	100% with recorder	Theodo-lite 33% Radar - lost 55%	Lost 15% C-45	193 min.	62 min. $\pm$ 1500'	Max. 18500' Const. 18000'	OK	First non-artificial balloon flight. Due to lack of information on volume the altitude control was not activated. However, flight was excellent stability of non-artificial balloons. Loss of lift due to balloon leakage 1000 gm/hr.
10	5 July 1947 0501 MST	Alamogordo New Mexico	1 M.A. Smith 15' .008" polyethylene	14.2 kg	74.5 mc Radiosonde Ballast assembly	16.3 kg	Dribbler Compass fluid	3 kg	5.6 kg	21.9 kg	812 min. with recorder	Theodo-lite 88 min.	OK	Over 518 min.	130 min. $\pm$ 200' 282 min. $\pm$ 2700'	Max. 15100' Const. 9000'	OK	Successful flight with altitude control working. Balloon reported over Albuquerque after 11 hours; Pueblo, Colorado after 26 hours. Fluctuation toward end of transmission believed due to convection currents over 400; Balloon diffusion 10 gm/hr.

TABLA VII
SUMMARY OF NYU CONSTANT-LEVEL BALLOON FLIGHTS

FLIGHT NUMBER	DATE AND TIME	LAUNCHING SITE	DESCRIPTION OF BALLOON	BALLOON WEIGHT	ENCLOSURES OR EQUIPMENT	WEIGHT WEIGHT OR BALLAST INCLUDING BALLAST	DESCRIPTION OF ALTITUDE CONTROL	BALLAST WEIGHT	FREE LIFT	BALLOON LIFT	RADIOSONDE RECAPTION %	TRACKING %	AIRCRAFT OBSERVATION %	FLIGHT DURATION	OPTIMUM ALTITUDE	MAXIMUM & CONSTANT LEVELS MSL	RECOVERY & LAND-ING SITE	CRITIQUE
11	7 July 1947 0600 MST	Alamogordo New Mexico	7 - General Mills 1 - 15' .008" Polyethylene 6 - 7' .001" Polyethylene in Helios cluster below 15' balloon	17.1 kg	74.5 ms Radiosonde Ballast assembly	15.9 kg	Dribbler Compass fluid Fixed leak 300 gm/hr	3 kg	11.3 kg	27.2 kg	97% with recorder	Theodolite 364	100% C-54	550 min.	423 min. ± 1500'	Max. 16000' Const. 16000'	0%	Balloons used in cluster to obtain higher altitude. In high wind at launching 3 small balloons deflated. Therefore cluster did not rise high enough to activate altitude control. Dribbler leak and balloon diffusion both 300 gm/hr. Therefore balloon remained at ceiling until ballast was expended.
12	5 Aug. 1947 0714 EST	Lakehurst New Jersey	1 - General Mills - 20' .001 Polyethylene	4.1 kg	3 ms transmitters 39.7 ms Radiosonde 72.2 ms Radiosonde Ballast assembly	28.0 kg	Automatic and manual ballast valves and minimum pressure switch	5 kg	3.8 kg	31.8 kg	100% Millman	Theodolite 15% SCR-638 90%	85%	407 min.	60 min. ± 400'	Max. 14100'	95% Myram, Delaware 85 mi.	First flight with large thin balloon. Open appendix caused balloon dilation with air-cover over appendix thought to have caused balloon rupture, terminating flight early and low. Flight not successful as balloon test or altitude control test.
13	5 Sept. 1947 0847 MST	Alamogordo New Mexico	2 General Mills 20' .001" Polyethylene. 10' appendices inside shroud lines	8.4 kg	397 ms Radiosonde Data Gear Ballast release	24.2 kg	Automatic Ballast release assembly	10.0 kg	3.8 kg	28.0 kg	100%	Theodolite 100% SCR-638 100%	Not required Burst over desert	58 min.	None (burst)	Max. 4760'	0% White Sands, N. M.	appendices twisted around shroud lines, preventing valving of gas at pressure altitude. Both balloons burst within 2 minutes and gear fell free to desert. Recovery not attempted.
14	6 Sept. 1947 0613 MST	Alamogordo New Mexico	1 General Mills 20' .001" Polyethylene. 10' appendix outside shroud lines	4.0 kg	397 ms Radiosonde Banner, Ballast release	15.1 kg	Automatic Ballast release assembly	5.0 kg	2.2 kg	17.3 kg	100%	Theodolite 100% SCR-638 100%	Last 10% (L-3)	53 min.	None (burst)	Max. 49000'	100% 6 mi. north of Alamogordo AAF	Appendix again twisted around shroud lines, preventing valving of gas at pressure altitude, where balloon burst. Descent retarded by banner.
15	6 Sept. 1947 1153 MST	Alamogordo New Mexico	1 General Mills 20' .001" Polyethylene. 1' appendix outside shroud lines.	4.0 kg	397 ms Radiosonde Banner, Ballast release	15.1 kg	Manual ballast valve. Fixed rate of leak 1000 gm/hr	5.0 kg	2.6 kg	17.7 kg	364 min.	Theodolite 175 min. SCR-638 364 min.	Not required Accurate data not required	More than 364 min.	71 min. ± 900'	Max. 45800' Const. 34000'	0%	First flight with large G. M. balloon which did not burst due to appendix. Ball valve holes in balloon due to high wind at launching caused slow descent after pressure height was reached. Shows need of short appendix and automatic ballast valve
16	8 Sept. 1947 0828 EST	Alamogordo New Mexico	1 General Mills 20' .001 Polyethylene. 2' appendix outside shroud lines	4.4 kg	397 ms Radiosonde Data gear Banner Ballast release	16.1 kg	Automatic Ballast Release assembly	3.2 kg	2.4 kg	18.5 kg	100%	Theodolite 100% SCR-638 100%	Not required A/s need to control for gear	30 min.	None (burst)	Max. 31700'	0% 6 miles NE Alamogordo AAF	Heavily loaded balloon with too much free lift (inflated by volume estimate in wind). High oscillations observed after release. Balloon burst due to blowing off top well below pressure altitude. Balloon came down with free falling gear but was not found.
17	9 Sept. 1947 1647 MST	Alamogordo New Mexico	1 W. A. Smith 15' .004" Polyethylene with 18 lead points	6.4 kg	397 ms Radiosonde Banner Ballast release	11.3 kg	Automatic Ballast release assembly 100 gm/hr fixed leak	4.0 kg	2.1 kg	13.4 kg	281 min.	281 min.	Not required night flight	estimated 10 hrs.	181 min. ± 500'	Max. 29700' Const. 29100'	Croft, Kansas 555 miles	Successful controlled altitude flight demonstrating altitude controls main during height through a descent. Balloon descended near Croft, Kansas long after passing out of Roswell's reception range. Need for a barograph shown.

New Mexico



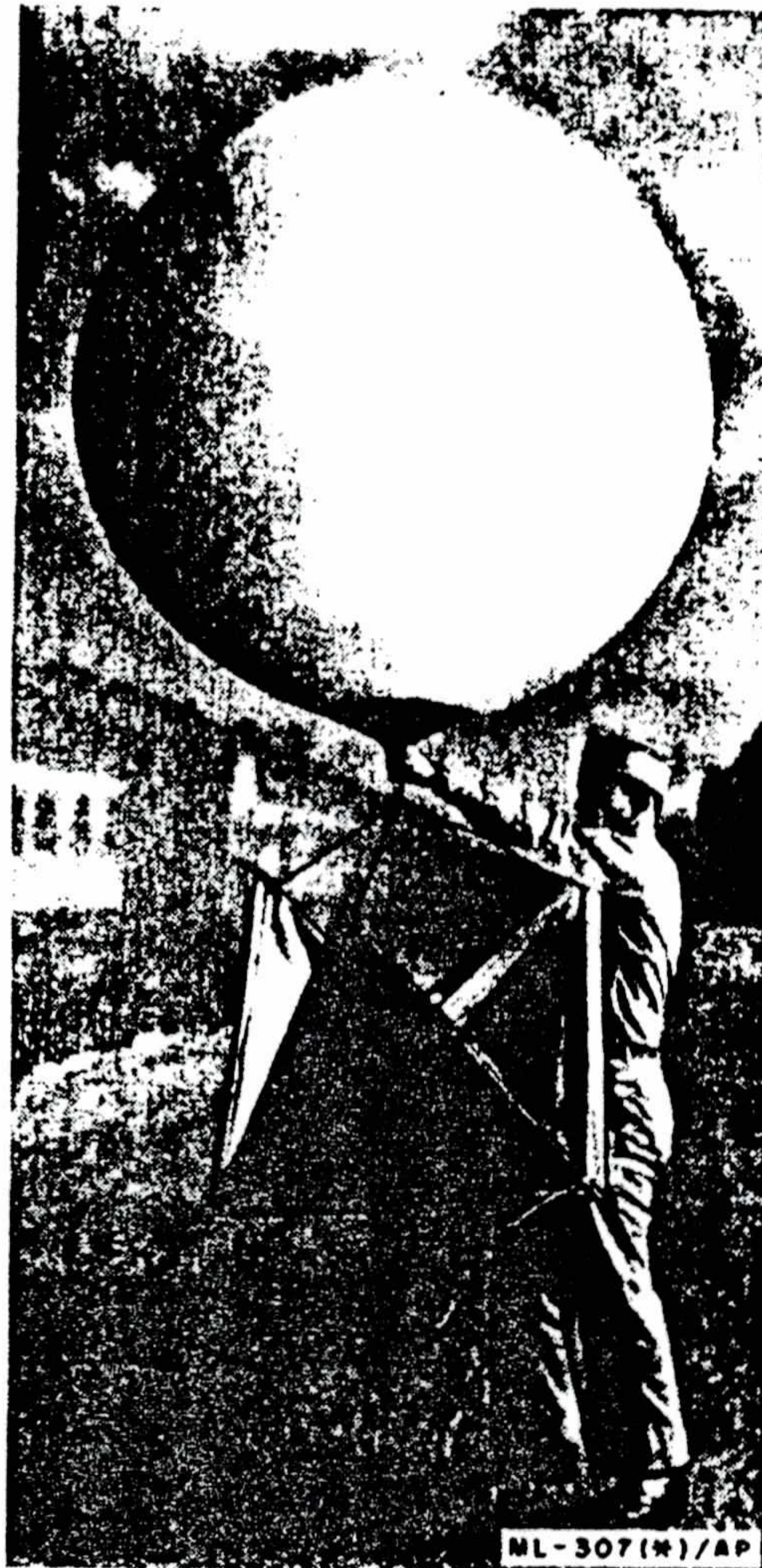


Figure 50. Pilot Balloon Target ML-307/AP or ML-307A/AP ready for flight.

Status: Standard. *Stock No.:* 7A1237. *Reference:* TM 1-235.

Pilot Balloon Target ML-307(*)/AP represents Pilot Balloon Targets ML-307/AP, ML-307A/AP, and ML-307B/AP. Pilot Balloon Target ML-307(*)/AP is a reflector which is attached to a 100- or 350-gram pilot balloon to assist in tracking it by radar. It is composed of a combination of triangular-shaped surfaces constructed of light, paper-backed aluminum foil supported by balsa sticks; it weighs approximately 100 grams. The target folds into a flat triangle for shipment. Pilot Balloon Target ML-307(*)/AP is designed to function best with Radio Sets SCR-584 (any model), SCR-545 (tracking components), and SCR-614 (any model). The targets are packed 24 to a shipping container.

Ltr Watson Labs. 14 Jun 46, subj: "Change in Class. of 'Mogul,' Item 188-5."

1st Ind.

TSELT-2/WHD/mch

Hq., Air Materiel Command, Wright Field, Dayton, Ohio. 8 July 1946.

TO: Commanding General, Army Air Forces, Washington 25, D.C.

THRU: (AC/AS-4)

1. To amplify the information given in the basic letter it is desired by Electronic Subdivision that the following information and scientific data pertaining to project "Mogul" be classified "TOP SECRET:"

a. Precise data as to the exact placement of measuring instruments.

b. Scientific observations and measurements that have military application.

c. Detailed methods of measuring results.

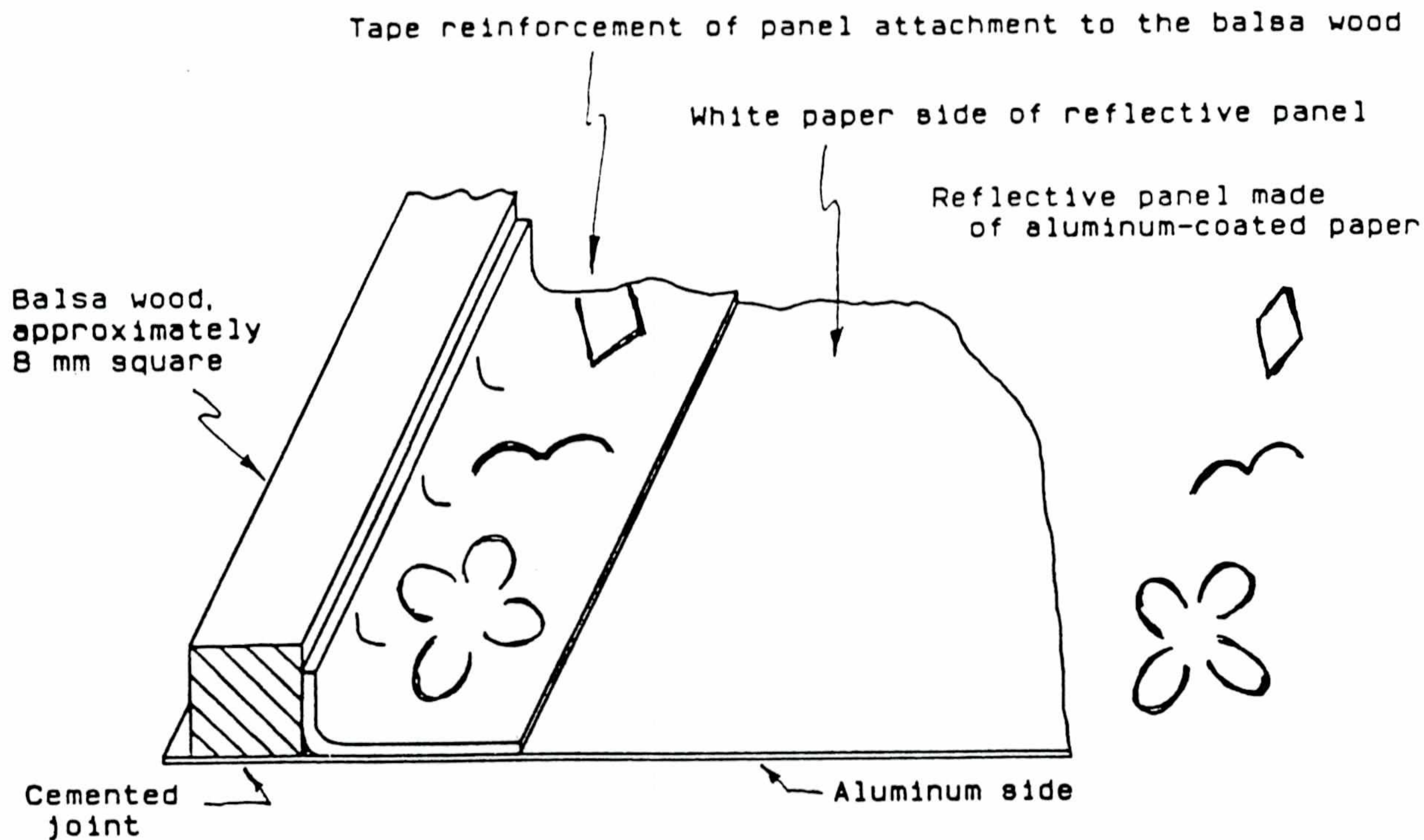
2. Engineering preparations for the final test that are not in conflict with the above will be classified "Confidential."

3. Contractual documents will be classified the same as the security classification of the equipments involved. Equipments used in project "Mogul" are common to other systems or sets that are now classified "Confidential," "Restricted," or "Unclassified;" contractual documents should be classified accordingly.

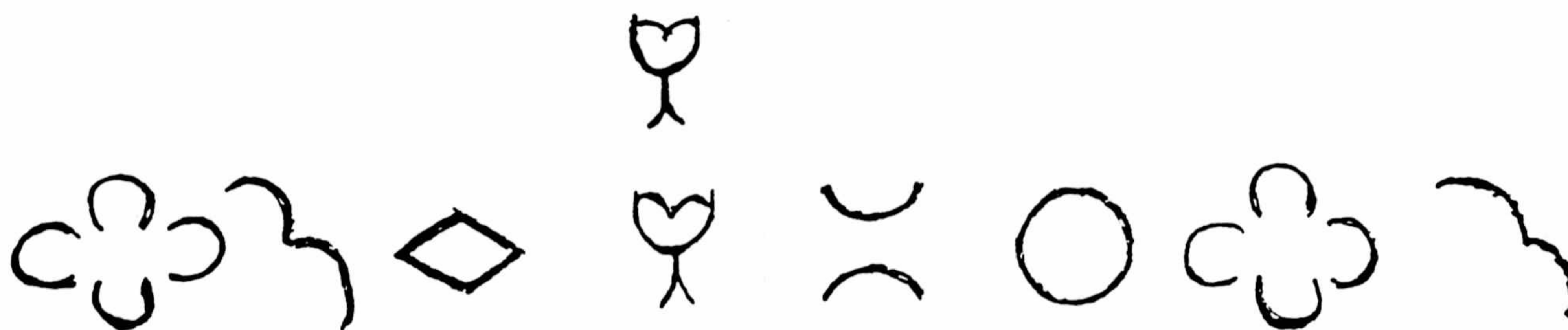
4. Authorization is requested to observe the security classifications proposed herein.

FOR THE COMMANDING GENERAL:

E. O'DONNELL
Brig.Gen., U.S.A.
Deputy Chief
Engineering Division



MY RECOLLECTION OF THE REFLECTOR MATERIAL ATTACHMENT TO THE Balsa WOOD PIECES
ON THE ML-307/AP PILOT BALLOON RADAR TARGETS IN 1947.



AN APPROXIMATE REPRODUCTION OF THE FIGURES PRINTED ON THE TARGET-REINFORCING TAPE
(This is not authoritative since I last saw one of these targets more than
20 years ago.)

C. B. Moore

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August 28, 1992

'ANTASY OF "FLYING DISC" IS EXPLAINED HERE



Above is a small series of the radar experimental equipment and personnel of the Watson Laboratories, AMC, which is attached to the White Sands Proving Ground. The equipment is being used to test a "flying disc" or corner reflector as the Army knows it. The flight by radar, photographing of the flight, charting and projecting upon a screen the progress of the disc, and the radar operator's view of the disc as it is detected by radar apparatus and shown on a screen which shows the picture of the flight is shown. Army Air Force photo.



Launching of the the corner reflector radar experimental device is about to take place in the above picture. This is undoubtedly the device reported far and wide as the "flying disc." It is, in the above picture, being pushed forward by a member of the Alamogordo News staff, shown to be a (wounded) member of the Alamogordo News staff. Each of these corner reflectors is held by the other and the two supporting balloons by ropes. On the edge of the board from which the "flying disc" is launched is a sign of the Alamogordo News staff, "Property of Army Materiel Command, Watson Laboratories, Army Air Field, Alamogordo, New Mexico. (Alamogordo News photo.)



Above (reading left to right) Major C. W. Mangum, Lt. E. W. Wright, Major W. B. Prichard, and Capt. L. E. Byrd, of Watson Laboratories Army Materiel Command long range radar direction group, at the Army Air Base, Alamogordo, New Mexico. These are the officers in charge of the station and Major Prichard the one who tested the corner reflector of the Alamogordo News staff to view the launching of a corner reflector Wednesday at 1 p. m. (Army Air Force photo.)

News Men Watch Army Radar Crew Launch "Disc"

Local "flying disc" and radar crew members of the Army Materiel Command, Watson Laboratories, Army Air Field, Alamogordo, New Mexico, were observed by the Alamogordo News staff on Wednesday, July 23, at the launch of the "flying disc" from the White Sands Proving Ground.

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Young Democratic Started In County

Members of the executive committee of the Young Democratic Organization for Otero County, the nucleus of the organization, the selection of the officers, was accomplished by the parent organization, and are as follows:

Allen D. Walker, Alamogordo, president; Ray Smith, Pecos, first vice president; Mrs. C. E. Duda, Alamogordo, second vice president; Larry M. Cloutier, third vice president; Chito Sanchez, Alamogordo, fourth vice president; Allen Duda, Alamogordo, secretary; Harold Duda, Alamogordo, treasurer; Billy Duda, Alamogordo, sergeant-at-arms.

The group was organized under the direction of Ingram B. Pickett, Alamogordo, and Vernon C. Pickett, Alamogordo, county Democratic chairmen.

A membership drive, social activities, and other functions are planned for the new organization, Mr. Pickett said. The state conference of Young Democrats will be held in Albuquerque August 14.

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Cloudcroft Host To Golf Tourney

Local talent at Cloudcroft will be out behind John Parker in the hope of defending their home course at the annual tournament which opens July 17.

Playing on the famous, highest in the world golf course, the qualifiers will conclude play on Thursday, July 17, and tournament play will begin.

Many unknown golfers are drifting in this week preparing for the tournament with some old favorites on hand for practice rounds.

Tucson, Arizona, will have about a half-dozen golfers on hand and Odessa, Texas, has about the same number of entries. El Paso will send the largest and strongest contingent, it was stated.

The greens and fairways were unblemished in good order for the tournament play.

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AAF Weather Experts Forecast For V-2 Firings

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M. P. Killed By Accidental Shot

Det. Louis Stricker, 34, military policeman assigned to the Alamogordo Army Air Base, was accidentally killed Wednesday afternoon, July 23, by a bullet fired from a .38 Smith & Wesson revolver.

The bullet struck Stricker in the chest, just below the neck, and penetrated his lungs. He was taken to the Alamogordo Army Air Base hospital, where he died shortly after midnight.

The bullet was fired from a .38 Smith & Wesson revolver, which was found near the scene of the shooting. The revolver was found in a room at the Alamogordo Army Air Base.

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