MSI PATCH SHEET

Dates, (style)

NAVAL MESSAGE — NAVY DEPARTMENT

DRAFTED	EXTENSION NUMBER	ADDRESSEES	PRECEDENCE
FROM COMDR WHEELUS FLD TRIPOLI LIBYA	FOR ACTION	COMDR 86TH ATS RHEIN MAIN GER COMDR NOUASSEUR AFB NOUASSEUR FR MOR	☐ FLASH ☐ EMERGENCY ☐ OPERATIONAL 0000000 ☐ PRIORITY ☐ ROUTINE ☐ DEFERRED
RELEASED BY			
DATE TYPED 13 SEP 1953			
TOR CRYPTOCENTER 1526/13	INFORMATION	COMUSFORAZ SECNAV SECDEF CINCLANTFLT COMEASTSEAFRON COMSUBLANT (SEE BELOW)	☐ FLASH ☐ EMERGENCY ☐ OPERATIONAL ☐ IMMEDIATE ☐ PRIORITY PPPPPPP ☐ ROUTINE ☐ DEFERRED
TYPED BY LYON			
ROUTED BY LYON			
CHECKED BY			

Unless otherwise indicated, this message will be transmitted with deferred Precedence

131335Z (DATE/TIME GROUP (GCT)) — 4432 (NCC/ANCC NO)

INFO ADEES CONT'D: EADX ROME NY, ADC ENT COLO, COMATLD MATS WESTOVER AFB MASS.

REF RHEIN MAIN MSG MATSRM 165 CL., DTG 121200Z, CONCERNING CIRVIS REPORT ON SUB SIGHTING. REQUIRED INFO CAN BE OBTAINED FROM 1703 ATG BROOKLEY AFB MOBILE ALA. CAPT M K FOUCHE AND LT H E HORTMANN ARE ATTACHED 1703 GROUP. ABV MENTIONED PERSONNEL NOT AT THIS STA.

03(32).....COG

SECDEF...ARMY...AF...SECNAV..05...JCS(SR)...COGARD...202...CIA...

DIRNSA...CNO OOD....

RESTRICTED

SECURITY INFORMATION

131335Z (DTG)

OPNAV FORM 2110-3 (REV. 8-51) DEPT USE ONLY

Paraphrase NOT Required Consult Cryptocenter before declassifying

D53989

NAVAL MESSAGE

NAVY DEPARTMENT

RELEASED BY	DRAFTED BY	EXT

DATE	TIME	ROUTED BY	CHECKED BY
27 OCT 1954	27/0912Z	ONORATO	RB/

424 (NO)

270630Z (DATE/TIME GROUP (GCT))

PRECEDENCE

(ACT)	(INFO)
☐ FLASH	☐
☐ EMERGENCY	☐
☐ OPERATIONAL IMMEDIATE	☐
☐ PRIORITY	☐ PPPP
☐ ROUTINE	☐
☐ DEFERRED	☐

PPPP

FROM: COMALSEAFRON

TO CINCAL//AAC ELMENDORF AFB

INFO USARAL//CNO//CINCPACFLT

CCGD 17 REPT UNIDENTIFIED FLYING OBJECT SEEN BY [redacted] DESCRIPTION, 1 BRIGHT SHINEY OBJECT SEEN 261915Z FOR 5 MINUTES THROUGH FIELD GLASSES 4 MILES NORTHWEST OF HAINES APRT 59-15 NORTH 135-34 WEST BY MRS HENRY BROUILETTE AND 2 OTHER PERSONS, WEATHER OVERCAST WITH OCCASIONAL BREAKS. NO OTHER INFO REC. TENTATIVE EVAL PENDING WRITTEN REPT: PROBABLE REFLECTION SUN FROM ADJACENT GLACIERS

92...COG
302...303...05...55...COGARD...33...30FILE...ARMY...AF...NIC

CONFIDENTIAL
(When filled in)

270630Z
DTG

OPNAV FORM-2110-4 (REV-7-54)
DEPT USE ONLY

Paraphrase NOT Required Consult Cryptocenter before declassifying

1251 G-2

22

A CHRONOLOGICAL SURVEY OF DATE STYLES USED IN MOORE'S LETTERS

LETTER TO:	DATED:
J. & C. Lorenzen	30 August, 1977
F. Durant	20 May, 1978
J. Ward	7 August, 1978
J. Ward	7 May, 1979
J. Ward	14 Aug. '79
Natl. Archives	10 September, 1979
J. Griffin	7 May, 1980
K. Korff	1 May, 1981
R. Anstee	24 August, '81
Memo to file	5th October, 1981
L. Philip	6 November, 1981
N.P.R.C.	9th November, 1981
USAF	November 10th, 1981
CIA	November 12th, 1981
USAF	November 19, 1981
R. Galen	11th January, 1982
USAF	March 5, 1982
USDA	5 May, 1982
DOE	5 May, 1982
Dept. of State	3 August,1982 (no space)
L. Maltz	2 September, 1982
Klass	5 October, 1982
L. Maltz	5 October, 1982
Klass	8 October, 1982
R. Carlisle	3 January,1983 (no space)
L. Maltz	5 January, 1983
D.O.D.	5 May, 1983
USAF	6 May, 1983
USAF	7 July, 1983
NARS	July 7, 1983
Klass	8 July, 1983
Rutledge	7th October,1983 (no sp.)
Klass	9 October, 1983
NARS	October 13, 1983
R. Anstee	01 November, 1983*
Klass	04 November, 1983
Klass	03 January, 1984
R. Anstee	01 March, 1984
CIA	6 March, 1984
D.O.D.	7 March, 1984
Klass	06 April, 1984
Moseley	27th April, 1984
J. Ward	07 June, 1984
Z. Hansen	o1 July, 1984 (sic.)
H. Taylor	05 July, 1984
R. Anstee	05 July,1984 (no space)
Eisenhower Lib.	28 November '84

*Earliest example found using zero-before-single-digit format.

J. Clark	06 June, 1985
Klass	07 July, 1985
Klass	26 Dec. '85
T. Brown	21 Feb.'86 (no space)
Klass	25 Feb. '86
Sherwood	4/02/86
J. Ward	4/30/86
Lebelson	8-20-86
Eisenhower Lib.	12 Sept. 1986
W. Verity	10/2/86
Klass	10/16/86
L. Gross	11/10/86
Klass	11/11/86
L. Maltz	02-20-87
W. Verity	10 FEB 87
Klass	16 March 1987
L. Maltz	23 MAR 87

29. FOREIGN SERVICE (incl. W. W. I - II) AND RESIDENCE

Country or Department	Approx. Incl. Dates	Arm or Service	Maximum Grade	Station or Reason for Residence

30. SPECIAL AND GENERAL SERVICE SCHOOLS AND SCHOOLS FOR SPECIALIZED TRAINING

Name and Place of School or Station	Length of Course	Success. Compl't Yes or No	Date	Description of Course
Univ of Puerto Rico	4mos	Yes	Mar '44	Tropical Meteorology
U.C.L.A.	9mos	Yes	Nov '42	Meteorology

31. LANGUAGES (F—Fluently; P—Passably)

Language	Speak	Write	Translate	Language	Speak	Write	Translate
Spanish	P	P	P				
German			P				

32. RESERVE, N. G. & ACTIVE DUTY

(a) ACTIVE DUTY TOURS

(c) THOMASON ACT

(d) REGULAR ARMY

33. RECOMMENDED FOR DUTY OR QUALIFIED IN M.O.S.

7 Apr 20 APR 1945

(P) Weather Officer 8219 JKA

~~8211 Weather Officer, Specialist (Tropical Forecaster)~~ JKA

34. REMARKS (Refer to Paragraph No.)

MOS Wea Off, Spec (8211) deleted. Auth: C3, AAF Man 35-1, 1 Feb 45.

"AAG Form 123 completed 1 Dec 44."

Previous ASN 0-857022

CERTIFIED MOS 8219 TKK 31 Jan 45.

Awarded Certificate of Meritorious Service 15 April, 1946

Cat VI - I elect to continue on extended active duty until 10 Oct 47 /s/ Edward A Doty, Capt, AC (see 201 file)

ASR ~~50~~ 62 "YES"-2211 (F)

PERSONNEL ORDERS: RATINGS, FLYING STATUS

OER ~~41.11~~ 40.00 31 Dec. 45 JWA 2211 10 Apr 45

Cleared for use on secret and confidential cryptographis systems of the Army by reason of favorable agency check of the Ninth Service Command Intelligence, FBI, and home town police, 15 Feb. 45. Results filed in Ninth Service Command.

W.D., A.G.O. Form No. 66-2 1 July 1943

AAF OFFICERS' QUALIFICATION RECORD

Mr. Frederick C. Durant III. 20 May, 1978
109 Grafton St.
Chevy Chase, MD. 20015

Dear Mr. Durant:

Thank you for your note of 16 May in response to my request to be permitted to use one of your pictures for my book. Since you inquire as to the "theme of the book", I am enclosing a newspaper account concerning it which appeared several months back, and which, although it tends to be a bit more on the sensationalistic side than I would prefer, tends to cover the topic fairly well.

As for my reason for wanting this particular picture, both Commander G.W. Hoover and Austin Stanton played small rôles in a somewhat bizarre and often misinterpreted "sideplot" to the whole affair. Since both these men appeared on the photo, I thought I might like to use it. You have my word that both men are treated fairly and in a positive light in the text without any sensationalistic overtones. There is nothing therein which would tend to damage the reputation of either of them. In fact, their involvement is merely a somewhat minimal part of my attempt to solve a mystery- a mystery which, in spite of the newsprint, I fall short of actually reaching a conclusion about in the book.

Your permission to use this photo will of course be most appreciated. If you are able to supply a glossy, please state cost. Otherwise I believe I can make an acceptable copy from the photo in the von Braun/Ordway opus.

Again thank you for your prompt response.

Sincerely,

WLM/s (encl) (W.L.Moore)

POBX 245
Herman, MN. 56248
30 August, 1977

Mr. & Mrs. Lorenzen
APRO, 3010 E. Kleindale Rd.
Tucson, AZ. 85712

Dear Lorenzens:

Some time ago you were kind enough to honor my request for a copy of one of your photographs of Carl M. Allen (Allende) which you took during his visit to Tucson in 1969. The purpose of this letter is to respectfully request your permission to publish this picture as part of the photo section of my forthcoming book which is tentatively titled The Philadelphia Experiment - Did it Really Happen? .

If you are kind enough to grant this request, please indicate whether publication is contingent upon any specific conditions or stipulations. Naturally APRO will be treated favorably in this book.

I have enclosed a copy of the photo in question for purposes of reference.

ON LOAN FROM
THE ARCHIVES OF
WILLIAM L. MOORE

Very truly yours,

Bill Moore.

William L. (Bill) Moore
APRO Field Investigator

This constitutes permission to use the photo mentioned above, with only a credit line for APRO.

Carol E. Lorenzen
Secretary, APRO

"C"

January 24, 1947.

no watermark

General Robert Cutler,
Old Colony Trust Company,
One Federal Street,
Boston 6, Massachusetts.

Dear Bobby:

I was glad to receive your letter of January 22.

I am not counting my chickens before they are hatched. The plan for unification does not amount to anything until Congress passes a law.

Nevertheless, the agreed program represents a distinct step forward. While we did not get everything that we wanted, the plan does provide for the single authority at the top that is needed, and it does provide for air force parity.

Hoping to see you soon and with best regards,

I am

Sincerely yours,

ROBERT P. PATTERSON

rpp:lm

Robert P. Patterson,
Secretary of War.

Copy sent to G. & R. Div.

REPRODUCED FROM THE COLLECTIONS OF THE MANUSCRIPT AND RARE BOOKS LIBRARY OF DARTMOUTH COLLEGE

July 18, 1947.

The President,

The White House.

Dear Mr. President:

I am submitting my resignation as Secretary of War, to take effect not later than July 24th.

As you know, I could not see my way clear to leave until the issue of reorganization of the military establishment was resolved. I have done everything in my power to promote the unity of the armed forces. Now that it appears that the reorganization law is about to be enacted in final form, the time has come to lay down the duties I have borne for seven years as Assistant Secretary, Under Secretary and Secretary of War.

I cannot leave without expressing my deep gratitude for the trust and confidence you have always given me, as well as my appreciation for the inspiring leadership you have furnished.

Sincerely yours,

[redacted]

Robert P. Patterson,
Secretary of War.

rpp/lm

REPRODUCED FROM THE COLLECTIONS OF THE MANUSCRIPT DIVISION, LIBRARY OF CONGRESS

no Watermark

March 1, 1946.

Dear Bobby:

I was glad to have your letter of February 27th with the petition on the unification of the armed forces. I appreciate your steady support and I miss having you on hand to take on some of the tough cases.

I hope you will drop in to see me when you are next in Washington.

Sincerely yours,

ROBERT P. PATTERSON

Robert P. Patterson,
Secretary of War.

General Robert Cutler,
Old Colony Trust Company,
One Federal Street,
Boston 6, Massahhusetts.

REPRODUCED FROM THE HOLDINGS OF THE HARRY S. TRUMAN PRESIDENTIAL LIBRARY

B

May 23, 1947.

Dr. Vannevar Bush, Director,
Office of Scientific Research and
Development,
1530 P Street, N. W.,
Washington 25, D. C.

Dear Van:

History of Radar.

I have your letter of May 21st.

In view of the situation that has developed, I think that it will be just as well if I drop out in connection with the Foreword.

Sincerely yours,

ROBERT P. PATTERSON

rpp/lm

Robert P. Patterson,
Secretary of War.

corres to d+R

130

REPRODUCED FROM THE COLLECTIONS OF THE MANUSCRIPT DIVISION, LIBRARY OF CONGRESS

RESEARCH AND DEVELOPMENT BOARD
WASHINGTON 25, D. C.

31 July 1952.

MEMORANDUM FOR MR. WHITMAN

SUBJECT: Air Force Investigation of Flying Saucer Phenomena.

1. The primary purpose of the Air Force investigation is to determine whether the phenomena represents a threat to security. The by-product of the investigation will be an increase in scientific knowledge because it will be necessary to investigate the various classes of this phenomena as scientifically as possible.

2. At the present time the Air Force has been unable to see any consistency of pattern or behavior of the several types of sightings, which would indicate that there is either a threat involved or that there is reasoning behavior behind them.

3. On the other hand the Air Force has made very little progress in learning what the phenomena or objects are and what causes them.

4. As a result of widespread publicity and considerable wearing off of shyness of certain types of people who have made sightings, there has been a many fold increase in the number of reports reaching the Air Force since early spring of 1952. These sightings, which comprised over 1,000 in the past six months, have reached a peak in the past month. This represents an increase in quantity, with little change in the character of the reports or the various statistical breakdowns which have been made in the past. Of these reports, all but 28% have been satisfactorily identified as mistaken reports on well-known objects, both celestial and man-made, and 15% contained insufficient data for evaluation. The unknown 28% of sightings included unexplained celestial phenomena, things believed by the sighters to be physical objects of various descriptions and unexplained radar sightings.

5. Although a small but significant percentage of sightings have been made by professionals or experts, such as scientists, engineers, pilots and trained observers, the reports have neither been accurate enough as descriptions nor have they contained sufficient measurements to provide sound data.

With Records
H. Lah

6. The Air Force apparently is coming to the conclusion that the reports from the public at large will be more confusing than helpful due to the well-known inability of human beings to report objectively and scientifically. The Air Force has therefore adopted a program with the objective of obtaining reports, photographs and measurements both from technically trained personnel and observers such as at airport towers and air defense sites. Initially this includes the distribution of several hundred cameras equipped with spectrographic lens attachments and a small number of the precise Schmidt astronomic cameras.

7. The Air Technical Intelligence Center has a Panel of Scientific Personnel available for consultation and in addition calls upon the scientific and engineering resources of the Air Force, particularly the ARDC, as needed. Contractural assistance for analysis of data is available and more is contemplated.

8. My own opinion, shared by some others more closely connected with the investigation is that the great mass of unknown reports are due to inadequately understood natural phenomena. These include such things as the fire ball phenomena and freakish behavior of the atmosphere which affects both optical sightings and radars. There may in addition be physical objects of natural origin floating through our atmosphere which have not yet been classified.

9. There is indicated a need for more basic research in the properties of the atmosphere and celestial objects which enter our atmosphere. There is need for more widespread knowledge of these factors, both in the military and in the civilian population. Since there is much basic research going on in many fields which will contribute to our knowledge, and process of education is under way, it doesn't necessarily follow that any specific program needs to be undertaken. However, it would be well to examine present programs with the thought in mind that our present situation results in entirely too much confusion in a nation which is on the alert for an air attack. We must know more about these phenomena to recognize them for what they are in order that they do not confuse the early warning picture and do not excite the populace.

Alfred R. Maxwell

ALFRED R. MAXWELL
Brig. General, USAF
Air Force Secretary

~~CONFIDENTIAL~~
~~SECURITY INFORMATION~~

HEADQUARTERS THIRD ARMY
OFFICE OF THE ASSISTANT CHIEF OF STAFF, G-2
FORT McPHERSON, GEORGIA

R&S
R-329779
7E

(125) G-2 452.1

6 JAN 1953

AJACI-2 319.1 Gen (G2)

SUBJECT: Reported Flying Saucer Near Ft Benning, Ga

TO: Assistant Chief of Staff, G-2
Department of the Army
Washington 25, D. C.

Forwarded herewith for information is Summary of Information, Columbus 5282, subject as above, dated 10 December 52, with exhibits.

FOR THE ASSISTANT CHIEF OF STAFF, G-2:

ROLAND R. HATFIELD
Major AGC
Chief, Adm Div, G2

8 Incls
1. S/I 5282
2. Exhibits 1-7

6 Jan 53

~~CONFIDENTIAL~~

Incl 1 only

SUMMARY OF INFORMATION

DATE: 10 December 1952

PREPARING OFFICE: Columbus Field Office, Region V, 111th CIC Detachment, Columbus, Georgia

SUBJECT: Reported Flying Saucer near Fort Benning, Georgia

CODE FOR USE IN INDIVIDUAL PARAGRAPH EVALUATION

OF SOURCE:		OF INFORMATION:	
COMPLETELY RELIABLE	A	CONFIRMED BY OTHER SOURCES	1
USUALLY RELIABLE	B	PROBABLY TRUE	2
FAIRLY RELIABLE	C	POSSIBLY TRUE	3
NOT USUALLY RELIABLE	D	DOUBTFULLY TRUE	4
UNRELIABLE	E	IMPROBABLE	5
RELIABILITY UNKNOWN	F	TRUTH CANNOT BE JUDGED	6

SUMMARY OF INFORMATION

Columbus 5282 (Reference Columbus 5275, 5277, and 5280)

1. On 10 December 1952, information was received from Wing Intelligence, Lawson Air Force Base, Georgia, regarding the sighting of a suspected Flying Saucer near Fort Benning, Georgia, at approximately 2130 hours, 21 November 1952. Details obtained from Wing Intelligence indicate that the object changed from blue-white to pink-orange during the ten (10) minutes it was in sight. It changed direction several times, hovered for a short period of time, and disappeared over the horizon. It was described as traveling at an incredible rate of speed, traveling from horizon to horizon in approximately ten (10) minutes. Eye witnesses stated that it could not have been a balloon because of its speed; nor could it have been an airplane since it traveled noiselessly. They also claimed that it could not have been any natural phenomenon. (Lawson AFB Reports forwarded as EXHIBITS 1, 2, 3, 4, 5, 6, & 7) (B-6)

END

2 - Int Div
1 - G2
1 - Ch CI Div
1 - 111th Files
- FAC
-

DISTRIBUTION
5 - Hq 111th CIC
1 - Region V
1 - File

One page only

RESTRICTED

SECURITY INFORMATION

011630 DEC 52 RESTRICTED

CG LAWSON AFB FT. BENNING, GA. PRIORITY

DIR OF INTELLIGENCE X
HQ USAF
WASHINGTON 25, D.C. X X

AIR TECH INT CTR, WRIGHT-PATTERSON
AFB OHIO, ATTN: ATIAA-2c

CG ENT AFB, COLORADO SPRINGS, COLO.

CG TAC, LANGLEY AFB, VA., ATTN: DC/S INTELL.

4341I PD FLYOBRPT CLN UNIDENT SINGLE PLY OBJ RPTD VIC FT BENNING CMA GA TWO ONE TWO ZERO HOURS TWO ONE NOVEMBER PD OBJ DESCRIBED AS BLUE DASH WHITE COLOR CMA TVLG WNW AT UNK SPEED PD OBJ APPEARED QUOTE SIZE OF GOLF BALL UNQUOTE PD OBJ THEN TURNED DULL ORANGE AND DISAPPEARED PD APPROX ONE MIN LATER CMA OBJ REAPPEARED IN ORIG COLOR CMA TURNED N FOR APPROX TWO MIN CMA THEN TURNED SSE AND HELD THIS COURSE UNTIL OUT OF SIGHT PD EVALUATION B DASH TWO PD END

RESTRICTED 1 1

WILLIAM H. BLANKFIELD JR, 2/LT, USAF

4341I 41120

RESTRICTED

SECURITY INFORMATION

612-397

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RESTRICTED

SECURITY INFORMATION

USA 2

RESTRICTED

FLYOBRPT

Fort Benning, Georgia — Wing Intelligence, Lawson AFB, Ga

5 December 52 — 27 November 52

William H. Blankfield, 2d Lt USAF — Interrogation of Eye Witnesses

TWX 434II003

1. The unidentified flying object was sighted in the vicinity of Fort Benning, Georgia at approximately 2120 hours on 21 November, 1952. When first seen it was of a bluish-white color and travelling a WNW direction but following a zig-zag course. It turned to a dull orange color and disappearedffrom sight. It reappeared in approximately one minute and it had returned to its original color and its position indicated it had been travelling while invisible. At this time the object turned North and held this course for about two minutes and then turned to a South-South East direction. It held a constant course in this direction until out of sight.

2. All observers seemed certain it was neither a meteor nor a weather balloon but none would venture an opinion as to what they thought the object was.

3. The weather was very good, with ceiling and visibility unlimited.

4. As far as can be ascertained by this Headquarters only five people observed this object. Their statements are forwarded with this report.

Original & Incls: D/I, Hqs USAF
Info Copy : D/I, 18AF, DC/S Intell, TAC (cc FLYOBRPT)

RESTRICTED

SECURITY INFORMATION

RESTRICTED

RESTRICTED

STATEMENT

At approximately 2120 hours 21 Nov 1952, I stepped out of my trailer with my brother A/1C Allen Salisbury, 434th Mtr Veh Sqdn. and S/Sgt Kenneth W. Hurd, 434th Mtr Veh Sqdn. As we were talking, I noticed a moving light in the sky. I at first thought it was a airplane or a weather ballon. Closer observation showed it was moving in a definate direction and maintaining the same approximately the speed and altitude. This fact was called to the attention of the two men with me. The light them began moving in an erratic manner, following the same general direction, but zig zaging. At this time I called my wife from the trailer to see it.

When first seen, the light was blue white in color and traveling in a West-Northwest direction. As the three of us watched it, it truned a dull orange in color and disappeared from view. In about one(1) minute it again reappeared and was again blue white in color. At this time the object turned north in direction and held this course for about two(2) minutes. At this time it turned to a south- southeast direction and held this course until it passed from sight byhind some trees.

At no time was there any sound that would indicate a airplane in the a area. The sky at that time was clear with the ceiling unlimited.

The entire time the object was watched by us was not over six minutes.

Listed below are the people who observed this object& their addresses.

S/Sgt Paul R. Salisbury	434th Motor Vehicle Sqdn.
S/Sgt Kenneth W. Hurd	434th Motor Vehicle Sqdn.
A/1C Allen Salisbury	434th Motor Vehicle Sqdn
Mrs. Lee C. Salisbury	Lot 114 Ft Benning Trailer Camp
Mrs. Allen Tate.	Lot 115 Ft Benning, Trailer Camp.

PAUL R. SALISBURY
AF 35 564 124
S/Sgt, USAF

43

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S T A T E M E N T

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SECURITY INFORMATION

I saw a round whitemoving object coming across the sky. It was very high and moving at a very fast speed. There was no sound and I watched it until it was out of sight.

Kenneth W. Hurd

KENNETH W. HURD
S/Sgt, USAF
AF 35 899 315

Ex 4

RESTRICTED
SECURITY INFORMATION

On November 21st, Sgt. Salisbury called to me and asked me to step outside of my trailer and look at an object in the sky. It looked like a bright star, only it was not falling, but traveling very fast from the North to East south East. I watched it until it disappeared from sight. It was a very clear and cold evening.

Signed: Mrs Allen Sat

12-37

RESTRICTED
SECURITY INFORMATION

47

[redacted]

On November 21st, 1952, at 9:20 P.M. I saw an unusual light, pinkish orange in color, hovering in the approximate direction West South West. Within one half of a minute, the light moved in a staggering manner to the North. It suddenly stopped, and changed color to a brilliant blue white, and shot across the sky over my head traveling in an East South East direction at an incredible speed, on a true course. It disappeared from view at exactly 9:26 P.M. - having gone from near horizon to near horizon in 6 minutes, including the time it hovered and reversed direction 3 times. The night was exceptionally clear and cool, and we timed the appearance by a clock just inside the trailer doorway. Both speed and height are impossible to calculate, but it did not appear to be eighter a weather baloon or a meteorite. There was no tail to it, or any wavering or staggering motion when it started East South East.

Signed;

[redacted]

[redacted] Fort Benning Trailer Court.

Ft. Benning, Georgia.

E 6

RESTRICTED
SECURITY INFORMATION

STATEMENT

On Friday evening, 21 November, 1952, At approximately 9:20 PM, I was at the Fort Benning Trailer Camp. My brother called my attention to an object in the sky. This object appeared to be over Lawson Air Force Base or farther west. It was a bright light, round and appeared to be rather high and was very bright. It was moving to the west as we watched it. It was going very fast. We were thinking that it might be a weather balloon, but it's course was in a streight line. It did not wobble as a weather balloon would nor did it gain any altitude. As we watched, it made a sharp right turn to the north. It went north for about a minute or twowhen it winked out. It was out of sight for a very short time. Then when it reappeared it was quite a distance from the place where it went out of sight. Making another right aggle turn, it came toward us very fast. It appeared to pass over our heads very high and very fast. It soon went out of sight to the East of us. I am sure it was not a weather balloon. I am equally sure it was not a airplane because there was not a sound. Nor were there any running lights, such as a plane would have. Also the directions it traveled and the aggles from which we observed it rules out the possibility of a plane. It looked more like a star or a meteor had come down and was manuvering over the fort. I am sure in my own mind that it was not anything from the Air Base or the Fort. I do not know what it was.

12-397

Allen Salisbury

ALLEN SALISBURY
AF 16 320 478

Ex 5

SECURITY INFORMATION

THE NATIONAL MILITARY COMMAND CENTER
WASHINGTON, D.C. 20301

THE JOINT STAFF

30 October 1975
0445 EST

MEMORANDUM FOR RECORD

Subject: Army National Guard Helicopter Support for Loring AFB

1. At 292035 EST Oct 75, LTC Dyer, Office of the Director of Operations, USAF, requested that the Army National Guard (NG) helicopter and crew currently located at Loring AFB, Maine, be made available to the Commander of the 42nd Bomb Wing until 300800 EST Oct 75. The NG helicopter would be employed to track and identify the unidentified helicopter that has violated the airspace in the vicinity of the weapons storage area at Loring AFB during the early morning hours of 28 and 29 Oct 75. LTC Dyer stated that international borders would not be crossed, and that apprehensions would not be attempted by personnel embarked in the NG helicopter. Any civil police on board the aircraft would participate only to the extent of communicating with appropriate police officials on the ground, with the latter singularly responsible for the apprehension of the suspect aircraft or crew.

2. This request was relayed to MG Sniffin, DA Director of Operations, DCSOPS, at 292100 EST. MG Sniffin indicated his intent to check with Army legal officials on the matter prior to making a decision.

3. The SAC Command Post was informed at 292050 EST of the request by LTC Dyer, and the fact that MG Sniffin was checking with Army legal authorities. Col Freeman, AF Operations Center, was also informed of the status.

4. Col Bailey, Mil Asst to the Special Asst to SECDEF/ DEPSECDEF, has been advised of the helicopter request should DOD approval be required.

5. The State Department Canadian Desk Officer has been kept informed of the situation.

6. At 292230 EST MG Sniffin approved use of the helicopter with the following constraints:

a. Tracking and identification only.

b. Apprehension by U.S. personnel not authorized.

c. No crossing of international borders.

d. Only U.S. personnel, preferably military, but including FBI, FAA, and Border Patrol representatives if necessary, will be on board the NG helicopter.

7. MG Sniffin will initiate appropriate action to place the Army NG helicopter and crew on "Full Time Training Duty" (FTTD). In essence, the NG helicopter will be federalized.

8. OSD, through Col Bailey, has been advised of the approval and constraints in this situation and has stated OSD has no objections to the action.

9. At 292249 EST the DDO (NMCC) established a conference call with SAC (MG Burkhart), AFOC, AOC, and Commander 42nd Bomb Wing, Loring AFB informing them of the approval to use the Army NG helicopter with the constraints listed in para 6 above. Commander 42nd Bomb Wing stated that there was no utility in using the helicopter if it couldn't cross the border. Air Force representative LTC Dyer was brought into the conference and stated that AF had no objection to the border crossing. At 292300 EST the DDO (NMCC) informed MG Sniffin of the border crossing issue.

10. At 292325 EST MG Sniffin informed the DDO (NMCC) that approval was granted for the NG helicopter to cross the border with the consent of Canadian authorities. The DDO (NMCC) assured MG Sniffin that the Canadians were cooperating and had already given consent to cross the border.

11. At 292334 EST another conference call was convened by the DDO (NMCC) with the above conferees, (para 9) informing them of the authority to cross the border if necessary. There were no further questions and all conferees were satisified with the procedures established for the employment of the NG helicopter.

C. D. ROBERTS, JR.
Brigadier General, USMC
Deputy Director for
Operations (NMCC)

Distribution:

CJCS (5)	CSA	PA REP
DJS (3)	CNO	WEST HEM DESK
J-30	CSAF	NWSB
J-31	CMC	NMCC BRIEFER
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J-32A	DDO (NMCC)	
J-33	ADDO (NMCC)	
J-34	CCOC (NMCC)	
J-35	DIA REP FOR NMIC	
	NSA REP	

~~CONFIDENTIAL~~

File No. 24-8 09 February,1949

REPORT OF INVESTIGATION

Rept. made by EDGAR J. BETHART
DO 17, Kirtland AFB

SPECIAL INQUIRY
(Aerial PHENOMENA)
30 January, 1949

Period: 31 Jan., 1,2,3,4,8 Feb.1949
Office of Origin: DO 17,Kirtland AFB
Status: REFERRED UPON COMPLETION

CHARACTER: SPECIAL INQUIRY

REFERENCE: Telephonic request from Captain MELVIN NEEF, on 31 January,1949

This investigation was requested by Captain MELVIN E. NEEF, 17th District OSI (IG) USAF. Seven people (7) were interviewed and six (6) readings were taken with a transit in an effort to locate the azimuth of the aerial phenomena.

Approved, A. C-Murelle, II
Captain, USAF
Acting District Commander

DETAILS

1. This investigation is predicated upon a telephonic request by Captain MELVIN E. NEFF, 17th Distric OSI (IG) USAF on 31 January 1949 to obtain all pertinent data in connection with an aerial phenomenon seen in the vicinity of Almogordo, New Mexico on Jan. 30 1949, at approximately 1800 hours.

2. On 1 Febuary Major JAMES C. PETERSEN,AO-561833, adjutant, Holloman AFB, Almogordo, New Mexico advised that on 30 January1949 at Approximately 1800 hours, he sighted a single bright green object in an Easterly direction. PETERSEN hesitated to estimate the altitude or distance of the object. PETERSEN described the object as a bright green ball of flame traveling in a Southerly direction, without evidence of smoke or a trail of any kind. PETERSEN advised that there were no clouds and that the object did not make any noises to his knowledge. PETERSEN advised that the object seemed "to fizzle out" in the air

3. On 2 Febuary 1949, the writer set up a transit at the approximate location where Major PETERSEN sighted the object and obtained the following readings:

Location: 33© North and 106© 05 1/2' East (Holloman AFB)
Object First Sighted: 55© Magnetic North and 3© elevation
Object Last Sighted: 63© Magnetic North and 3 1/2© elevation

4. On Febuary 3 1949, at the Office of Special Investigations, Holloman AFB, the writer interviewed Mr.??????? electronics technician with ????? Aircraft Company , Holloman AFB, who advised that on 30 January 1949, at approximately 1800 hours,while in the vicinity of Tularosa New Mexico, and in the company of Sgt. MAURICE C. ANTHON,AI-20923264, Holloman AFB, he saw single, bright green ball of fire to the East. The ball of fire seemed to be traveling in a southerly direction. Mr. ?????? believed the object to be at an elevation of about 15© but declined to make an estimate of his distance from the object. He advised

[redacted] C-1

HEADQUARTERS UNITED STATES AIR FORCE
THE INSPECTOR GENERAL
OFFICE OF SPECIAL INVESTIGATIONS

REPORT OF INVESTIGATION

FILE NO. 24-8

DATE 9 February 1949

REPORT MADE BY: EDGAR J. BETHART

REPORT MADE AT: DO #17, Kirtland AFB

PERIOD: 31 January; 1, 2, 3, 4, 8 February 1949

OFFICE OF ORIGIN: DO #17, Kirtland AFB

STATUS: REFERRED UPON COMPLETION

TITLE: SPECIAL INQUIRY (Aerial Phenomena) 30 January 1949

CHARACTER: SPECIAL INQUIRY

REFERENCE: Telephonic request from Captain MELVIN [redacted], on 31 January 1949.

SYNOPSIS:

This investigation was requested by Captain MELVIN E. [redacted], 17th District OSI (IG) USAF. Seven (7) people were interviewed and six (6) readings were taken with a transit in an effort to locate the azimuth of the aerial phenomena.

CLASSIFICATION CANCELLED [redacted]
BY AUTHORITY OF THE DIRECTOR OF SPEC INV
BY [redacted], Capt, USAF
Historian
3 DEC 1975
DATE

DISTRIBUTION:

DO #17, Kirtland AFB (Action Copy) 4
OSI, Headquarters 2
File 2

ACTION COPY FORWARDED TO: DO #17, Kirtland AFB

APPROVED:

A. C. [redacted], II
Captain, USAF
Acting DISTRICT COMMANDER

FILE STAMP

24 185 1A3

UNCLASSIFIED

[redacted]

[illegible]:

1. This investigation is predicated upon a telephonic request by Captain [illegible] E. [illegible], 17th District OSI (IG) [illegible] on 31 January 1949 to obtain all pertinent data in connection with an aerial phenomena seen in the vicinity of Alamogordo, New Mexico on 30 January 1949, at approximately 1800 hours.

2. On 1 February Major [illegible] C. [illegible], AO-561833, Adjutant, Holloman AFB, Alamogordo, New Mexico advised that on 30 January 1949 at approximately 1800 hours, he sighted a single bright green object in an [illegible] direction. [illegible] [illegible] to estimate the altitude or distance of the object. [illegible] described the object as a bright green ball of flame traveling in a northerly direction, without evidence of smoke or a trail of any kind. [illegible] advised that there were no clouds and that the object did not make any noise to his knowledge. [illegible] advised that the object seemed "to fizzle out" in the air.

3. On 2 February 1949, the writer set up a transit at the approximate location where Major [illegible] sighted the object and obtained the following readings:

Location: 32° [illegible] and 106° [illegible] West (Holloman AFB)

Object First Sighted: [illegible]° Magnetic North and [illegible]° elevation.

Object Last Sighted: [illegible]° Magnetic North and [illegible]° elevation.

4. On [illegible] February 1949, at the Office of Special Investigations, Holloman AFB, the writer interviewed [redacted] electronic technician with [redacted] [illegible], Holloman AFB, who advised that on [illegible] January 1949 at approximately [illegible] hours, while in the vicinity of [illegible], [illegible] and in the company of [illegible], Holloman AFB, he saw a single, bright green ball of fire to the [illegible]. The ball of fire seemed to be traveling in a [illegible] direction. [redacted] believed the object to be at an elevation of about [illegible]° but declined to make an estimate of his distance from the object. [redacted] advised that the ball was visible for approximately [illegible] seconds. [redacted] stated that there was no apparent exhaust to the object, nor were there any clouds in the sky. [redacted] stated that the object seemed to [illegible] and did not explode.

5. On [illegible] February 1949, [illegible] [illegible] [illegible], [illegible], Weather Detachment, Holloman AFB, Alamogordo, New Mexico advised that he had seen a green ball of flame with a trail of some kind in an Easterly direction. [illegible] [illegible] to him for approximately [illegible] seconds. [illegible] [illegible] [illegible] [illegible]. [illegible] advised that there were no [illegible] and no apparent wind, and that the object was [illegible].

[redacted]

found a British Guard unit there under the command of a captain—all very tall and all wearing berets. They brought to mind the merry men of Sherwood Forest.

MAIN HEADQUARTERS,
21 ARMY GROUP.

18 Sep, 44.

TO WHOM IT MAY CONCERN

Col. B.T. PASH and Major R.H. FURMAN are on a mission on behalf of the Supreme Commander. They should be given every facility.

[signature]

BGS(I).

The captain had a detailed map of the area, enabling us to pinpoint the plant to be investigated. It was one of four standing together on the canal, with high brick walls on three sides. The fourth side, open, was now exposed to the Germans. According to the British captain, the factories were in "no man's land"—occupied by neither side. Patrols of both sides were making raids through the area. The captain objected when told we were going in. He claimed it would be too dangerous. But my SHAEF credential did the trick. The captain promised to provide cover in case of trouble.

To get to our objective, the farthest of the plants, we had to traverse areas covered by German guns. The British had marked the extent of the lateral range of those guns with whi[illegible]ape, indicating the corridors down which the Germans [illegible]ur lead. One of the lanes was narrow; the other was [illegible]v-five feet wide. We had to cross both.

The British captain told us that the Germans had tried to cross the canal the day before and had been beaten off. He suggested that warning shots be fired at the first indication that the Germans again might be attempting to cross. He would then try to send a detachment to get us out of trouble.

I positioned the jeeps about sixty yards from the raised railroad crossing. When everyone was set and each man had a good grip on some solid part of the jeep, Gerry and Carl got the signal to go ahead. They made two fast shifts while gunning the vehicles, and we hit the crossing at better than fifty miles an hour. Sailing through the air like water-skiers at Cypress Gardens, we came down on all four wheels in a perfect four-point landing that failed to slow us down. We were out of range of the German guns in less time than it takes to describe our ride, and well ahead of the short bursts from small arms. I lost my grip on the jeep, however, and came down with a thud. My steel helmet was all that prevented my spine from coming out through the top of my head.

In the factory compound we were astonished to find several employees. One warned us to use the buildings for cover because the area was open to view from the opposite side of the canal. We backed the jeep against a wall, facing the gate so that if necessary we could pull out swiftly.

The plant manager came out to meet us. Gerry and Carl took positions on the canal side just in case the enemy should become serious. The two were to open fire if the Germans as much as got their feet wet. Reg and I accompanied the manager into the building. We told him that we had checked with his office in Antwerp and were on orders to inspect the plants in the area. He was to make available to Reg Augustine any information or documents we might require.

I went out to look at the warehouses. Just then the quiet was broken by the whizzing and whining of mortar projectiles, followed by explosions. I dived behind a stack of filled sacks close by. Carl's position was not too far from my cover. He shouted that he and Gerry were all right but "ready and willing to leave" any time I considered the job done. Meanwhile, the Tommies were going into action on either side of us and the German fire soon died down.

The fireworks outside had not stopped Reg Augustine. The records he turned up revealed that about 70 tons of the refined uranium ore remained at the plant, that the Germans had removed some 1,000 tons, and that the Belgians on 4

DEPARTMENT OF THE AIR FORCE
STAFF MESSAGE DIVISION
INCOMING UNCLASSIFIED MESSAGE

EMERGENCY JEPHQ JEDEN JKDAG EPAC JCPDC JFIC JEXW JENC JEOC ZEN ADOCC

DE JEXC 1

Y 042355Z ZFF

SEP 5 12 51 '53

HQ. USAF

FM COMDR 64TH AD PEPPERRELL AFB NF

TO JEPHQ/DIRECTOR OF INTELLIGENCE HQ USAF WASHDC

JEDEN/CG ADC ENT AFB COLO

JKDAG/CG AACS ELMENDORF AFB ALA

BEPAC/CO USNS ARGENTIA

JCPDC/CANAIRDEF ST HUBERT QUEBEC

JFIC/COMDR ICE DEFENCE KEFLAVIK ICELAND

JENC/COMDR 6602ND ABG HARMON AFB NF

JEOC/COMDR 6603RD ABG GOOSE AFB LABR

JEXW/COMDR 6610 ABG MCANDREW AFB NF

ZEN/COMDR 6600TH ABG PEPPERRELL AFB NF

ADOCC 16 ONE UNIDENTIFIED AIRCRAFT SIGHTED VISUAL AND GCA AT 48-0 8N 53-12W 04/2355Z OVERHEAD CYYT/HEARING NNW-/SAME AS C-47 100 K 3000 SIGHTED BY F/O CARTER RCAF MESSAGE RECIEVED THIS HEADQUARTERS AT 04/0400Z RESSARCHED FLT PLN TRAFFIC GCA CONTACT 15 SCTRD 15 VSBY/ A/C REPORLEDLY DROPPED GREEN FLARE PROCEED NORTH 12 MILES RETURNED HEADING SOUTH FADED ON GCA AT 15 MILES SOUTH REQUEST CHECK OF FLIGHT PLANS FOR POSSIBLE CORRELATIONPD 05/0142Z SEP JEXC

ACTION: OIN

INFO : OOP, OOP-CP, OAC, ARMY, NAVY, JCS, CIA, NSA, COMM CTR

CAR/aw

AFHQ FORM 0-309d
19 JAN 51
PREVIOUS EDITIONS OF THIS FORM MAY BE USED

16—63739-1 U. S. GOVERNMENT PRINTING OFFICE

1 a. c

MESSAGE

DEPARTMENT OF THE ARMY
STAFF COMMUNICATIONS OFFICE

EMERGENCY

AF MSG

FROM: COMDR 64TH AD PEPPERRELL AFB NFLD

TO: DIR OF INTELL USAF WASH DC, ET AL

NR: ADQCC 16 042355Z SEP 53

Text on following page.

AF MSG

INFO: CSA, G2, G3

DA IN 805751 (5 Sep 53)

RECORD SECTION CO
Personnel Security Br

979 SEP 5 53

OCS FORM 375 1 AUG. 51 REPLACES OCS FORM 375, 1 MAR 51, WHICH MAY BE USED.

16 c

DEPARTMENT OF THE AIR FORCE
STAFF MESSAGE DIVISION

INCOMING UNCLASSIFIED MESSAGE

TMB046

JFA049

JEX B52

REC. STF. MSG. DIV.
SEP 5 04 50 '53
HQ. USAF

EMERGENCY JEPHQ JEDEN JKDAG BEPAC JCPDC JFIC 666

DE JEXC 5

Y 050320Z ZFF

FM COMDR 64TH AIR DIV DEF PEPPERRELL AFB NF

TO JEPHQ/DIRECTOR OF INTELLIGENCE HQ USAF WASHDC

ZEN/CG NEAC PEPPERRELL AFB NF

JEDEN/CG ADC ENT AFB COLORADO SPRINGS COLO

JKDAG/CG AAC ELMENDORF AFB ALASKA

BEPAC/CO USNS ARGENTIA NF

JCPDC/COMAIRDEF ST HUBERT QUEBEC

JFIC/COMDR ICE DEF FOR KEFLAVIK ICELD

ZEN/CC 6660TH ABG PEPPERRELL AFB NF

ADOCC 19 FLYOBRT EVALUATION: IT IS ASSUMED THAT THE OBJECT REPORTED AS A GREEN FLARE DROPPED FROM UNIDENTIFIED AIRCRAFT AT TORBAY AIRPORT AT 04/2355Z WAS PROBABLY A METEOR SEEN SIMULTANEOUSLY AT ARGENTIA BY GCI PERSONNEL ALSO DUE WEST OF THEIR STATION

05/0340Z SEP JEXC

ACTION: CIN

INFO : OCF, OCP-OP, OAC, ARMY, NAVY, JCS, CIA, NSA

EAN/vls

AFHQ FORM 0-309d
19 JAN 51
PREVIOUS EDITIONS OF THIS FORM MAY BE USED

16—63783-1 U. S. GOVERNMENT PRINTING OFFICE

CONFIDENTIAL

ESSAGE

DEPARTMENT OF THE ARMY
STAFF COMMUNICATIONS OFFICE

HQS	
CLEAR	
DISPO	
P&S	
R&D	✓

CONFIDENTIAL
PRIORITY (BOOK MSG)

PARAPHRASE NOT REQUIRED
CONSULT CRYPTOCENTER BEFORE DECLASSIFYING
NO UNCLASS REPLY OR REF IF DTG IS QUOTED

FROM: COMNEACOM PEPPERRELL AFB NFLD

TO: CSUSAF WASH DC FOR AFOIN 2A1

NR: NEOIN 5313 081733Z JUL 55

ACTION COPY

Text on following page.

ACTION: AF, (ARMY G2)

INFO : G3

DA IN 152494 (12 Jul 55)

R/S

nls/12

HQD255

XTA099

JWPJN 2165

DEPARTMENT OF THE AIR FORCE
STAFF MESSAGE DIVISION

INCOMING UNCLASSIFIED MESSAGE

REC'D OFFICE
APR 3 22 '64
HQ. USAF

EMERGENCY JEPHQ JEDEN 222

DE JWPNC 016

Y 032203

FM HAMILTON F/S CALIF

C JCPHQ/SEC DEF WASH DC /SECRETARY OF DEFENASE

JEDEN / CG AIR DEFENSE COMMAND ENT AFB COLORADO SPRING COL

CWPNL/CG HAMILTON AFB HAMILTON CLIF

PAA 946 PSN30.5N 130.5W AT 2116Z 247 DEGREES 202K GND SPEED

SIGNED 3 SUBS AT PSN 305 1N 1293OW AT 2100Z APROX HEADING 070

DEGREES

03/2207Z APR JWPNC

JOINT COMMUNICATIONS OFFICE 9421

~~SECRET~~ IN MESSAGE T.O.O: 080800 Aug. 1947

~~SECRET~~ REC'D: 1200 EDT 9th Aug.

~~SECRET~~

FROM: A.M. LONDON

TO: FAFDEL CYPHER MESSAGE

AIX 6328 Aug. 8th 1947

Your AIX 14 July 29th.

During normal night flying practice at 2230 hours on 16th January, 1947, one of our Mosquitos was vectored on to an unidentified aircraft at 22,000 feet. A long chase ensued commencing over the North Sea about 50 miles from the Dutch coast and ending at 2300 hours over Norfolk. Two brief AI contacts were made but faded quickly. The unidentified aircraft appeared to take efficient controlled evasive action.

2. No explanation of this incident has been forthcoming nor has it been repeated.

ACTION COPY

I.C.M.

I.M.

C.I.O. (Action)

This page was referred to the USAF.

DEPARTMENT OF THE AIR FORCE
STAFF MESSAGE DIVISION

INCOMING UNCLASSIFIED MESSAGE

REC STF MSG DIV
APR 5 21 36 54
HQ USAF

EMERGENCY JEPHQ JEDEN JKDAG JCPDC JEOC 555

DE JEHC 59A

Y 052000Z

FM COMDR 6611TH AB GP NARSARSSUAK AB GRNLD

TO JEPHQ/DIRECTOR OF INTELLEGENCE HQ USAF WASHDC

JEXC/COMDR NEAC PEPPERRELL AFB NFLD

JEDEN/COMDR ADC ENT AFB COLORADO SPRINGS COLO

JKDAG/COMDR AAC ELMENDORF AFB ALASKA

JEMZC/CINCLANT

JEPAC/COMDR USNS ARGENTIA

JEXC/COMDR 64TH AIR DIV PEPPERRELL AFB NFLD

JCPDC/CANADREY ST HUBERT QUEBEC

JFICG/COMICEDEFOR KEFLAVIK ICE

JEXC/COMDR 6600TH AB GP PEPPERRELL AFB NFLD

JEMC/COMDR 6602ND AB GP ERNEST HARMON AFB NFLD

JEDC/COMDR 6603RD AB GP GOOSE AB LBR

JEMC/COMDR 6610TH AB GP MCANDREW AFB NFLD

JEQSU/COMDR 6612TH AB GP THULE AB GRNLD

JEQA/COMDR 6621ST AB GP SONDRESTROM AB GRNLD

ATTN: COMMAND OPERATIONS CENTER PEPPERRELL

INT 1213 FOLLOWING INFT RECEIVED FROM DANISH LISION OFFICER THIS HEADQUARTERS PD QUOTE ONE ACFT OBSERVED OVER KAP BROER RYYS LOCATED AT 7332N 2030W AT 042015Z PD ACFT CAME FROM NE TO SW GRM MADE A TURN BACK TO NE PD RADIO CONTACT WAS TRIED FROM DANEBORG 7416N 2030W TO ACST GRM NO ANSWER PD ALSO STA. NORD APPROX LOCATION IS 8138N 1700W GRM HAD RADIO CONTACT WITH AN ACFT ON 0516Z PD UNQUOTE FLIGHT PLANS CHECKED THIS STA NEG INFO AS TO WHAT THEY MIGHT HAVE BEEN. PD PLEASE CHECK YOUR FLIGHT FOR INFO PD

05/2005Z APR JEHC

RECEIVED
Scientific Intelligence Division
51-155-9
11 AUG 1950

RECEIVED
11 AUG 1950
DEFENCE RESEARCH BOARD

312

JOINT INTELLIGENCE COMMITTEE

OFFICE OF THE SECRETARY
NATIONAL DEFENCE HEADQUARTERS
OTTAWA

11 August, 1950.

Note: STF

MEMORANDUM FOR THE JOINT INTELLIGENCE COMMITTEE:

Flying Saucers

1. Enclosed for your information is a copy of memorandum S.21-1-9 (DAI) dated 4 August, 1950, from the Acting Director of Air Intelligence, on the above-noted subject.

2. This matter will be included on the agenda for the next meeting of the Committee, date to be notified later.

J.H. Trotman

(J.H. Trotman)
Acting Secretary.

Enc.

IN REPLY PLEASE QUOTE
RÉFÉRENCE À RAPPELER
DRBS 3800-10-1 (SA/VCDS)

DEFENCE RESEARCH BOARD — CONSEIL DE RECHERCHES POUR LA DÉFENSE

DEPARTMENT OF NATIONAL DEFENCE
MINISTÈRE DE LA DÉFENSE NATIONALE
CANADA

15

Ottawa 4, Ontario,
1 November, 1967.

Note SF

To: Distribution

UFO INVESTIGATIONS

1. Occasionally, establishments are asked to assist local units of the Canadian Forces in investigations of Unidentified Flying Objects (UFO's). As I am the link between DRB and CFHQ in this area, you are requested to notify me of requests for investigations of UFO's and to submit any resulting reports of investigations to me.

Original Signed By
H. SHEFFER

H. Sheffer
SA/VCDS
for Chairman, Defence Research Board.

DISTRIBUTION

CS/DREA
CS/CARDE
CS/DRTE
CS/DCBRE
CS/DRET
CS/DRES
CS/DREP

DC(Sc) Correspondence Diary

MEMORANDUM

14

V 2000-4 Vol. 2 (/)

8 November, 1967

Note: SIF

DDOps

INVESTIGATION - UFO REPORTS

Reference: Your memorandum dated 26 September 1967

1. I spoke to Dr. R.S. Rettie, NRC (Tel. 3-2544) concerning NRC's position. DND requested (Minister's letter dated 4 [illegible] 67) that NRC take over. NRC's reply was due in their internal office 25 Oct 67.

2. Dr. Rettie did not have copies of either their draft or the Minister's letter, which is presumably still en route. He did state, however, that NRC would itself be willing to undertake only a passive role; they would be prepared to prepare data for reply to parliamentary inquiries, for example. According to Dr. Rettie, NRC would not undertake field investigations, nor would they ask for information from any person or group. This statement specifically excludes IAS/Voff. Should Dr. Patterson ask for a grant or contract, the request would be considered on its merits.

3. All this adds up to a quite listless approach: the NRC staff members concerned appear to be personally convinced that UFO sightings do not merit serious attention.

4. Under these circumstances, I am sure that no particular advantage would be gained by having NRC [illegible] as far as serious investigation is concerned, [illegible] any necessity of answering questions by [illegible].

5. Let us hope that U of T actually [illegible] won't do much without asking for money from the [illegible].

E W GREENWOOD

E. W. Greenwood
SC/DCOps
2-0199

EWG/fm

c.c.--SA/VCDS

24

V 1540-1050 TD 7165 (SEC VCDS)

11 September, 1967

Note

STF

DCOps

CANADIAN AERIAL PHENOMENA INVESTIGATIONS COMMITTEE

References: A. V 1540-1050 TD 7165 (DOps) of 10 July, 1967.

1. VCDS would like you to prepare the following memoranda:

   a. from MND to Mr. Drury requesting the RMC undertake the responsibility for any scientific investigations of UFOs that may be required, and

   b. from CDS to MND explaining the reasons for this and attaching supporting data.

2. Please staff memoranda through SA/VCDS.

Encl.

Ministerial Inquiry
Folder No. 331
(67/1094)

D.E. Samson
Commander
SEC VCDS
2-3104

D.E. Samson, Commander/2-3104/cebn

Dr. Shaffer - to note.

134

Ottawa 4, Ontario
17 August, 1966

Note: SIF

CS/CARDE

Sighting of Unknown Object in Sky

1. The attached memorandum has been referred for attention.

2. We would appreciate your comments as to whether this object can be related to CARDE activities during the period in which the sighting took place.

(C.R. Baker, LtCol)
for Chairman
Defence Research Board

Att.
CRB:pjc

IN REPLY PLEASE QUOTE
RÉFÉRENCE À RAPPELER
CARDE 3800-1

133

DEFENCE RESEARCH BOARD — CONSEIL DE RECHERCHES POUR LA DÉFENSE

DEPARTMENT OF NATIONAL DEFENCE
MINISTÈRE DE LA DÉFENSE NATIONALE
CANADA

CANADIAN ARMAMENT RESEARCH AND DEVELOPMENT ESTABLISHMENT
P.O. Box 1427, Quebec, P.Q.

CENTRE CANADIEN DE RECHERCHES ET PERFECTIONNEMENT DES ARMES
C.P. 1427, Québec, P.Q.

SEP 1 1966 DEFENCE RESEARCH BOARD 9

30 August, 1966

Prcd. to DWER
SEP 1
File No. DRBS3800-10-1
Ch. DAR 15 Aug 66.

Chairman,
Defence Research Board,
Ottawa, Ontario

Note STT

Sighting of Unknown Object in Sky

1. Reference is made to your letter DRBS 3800-10-1 (DWER) dated 17 August, 1966.

2. This sighting is not related to CARDE activities. Mr. Lortie, Superintendent of our Technical Services Wing, suggests that the latitude of the sighting might indicate a balloon launched from Fort Churchill.

(W.N. English)
for Chief Superintendent

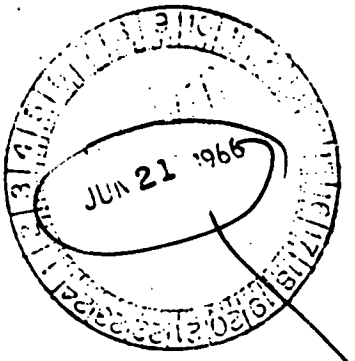
DAR
Draft
Noted & reply passed to DOSS/mb 6 Sept/66

1. Reference your request dated 15 Aug.
2. Please note above reply

C.R. BAKER LT. COL.
for Director

SEP 6 1966

1879.
SEP 1 1966



138

D1350-500/11 (DIS)
DHS 3000-10-1

Canadian Forces Headquarters,
Ottawa 4, Ontario.

17 June, 1966

Mr. [redacted]
Apt. 7,
Oakville, Ontario.

Dear Mr. [redacted]

Your letter of June 10, 1966 concerning recent reported sightings of UFOs is acknowledged.

In reply to your questions the following information may be of use to you:

1. In the early 1950's, scientific committees were established under the auspices of the Department of National Defence, to study and evaluate reports of unidentified flying objects. After several years of study the committee was able to explain all but a very small percentage of the many thousands of reports. In all cases the explanations reveal the source as being man-made or of natural phenomena. The instances where no explanations were possible were those that had been only vaguely described, and in most cases, unreliably reported.

2. As sightings of UFOs are usually reported by persons other than members of the Armed Forces, it is normally only after such sightings that the Department of National Defence can carry out investigations. If, however a sighting is made by a member or members of the Armed Forces, such sightings are reported immediately to the responsible authority.

3. As mentioned above, all UFOs with few exceptions have been identified as man-made or of natural origin. The Department of National Defence does not conclude anything from this information, other than the fact that the average viewer is not familiar with a large variety of natural phenomena well known in scientific circles. It is interesting to note that stories of UFOs have existed through history, the earliest recorded one probably being that described in the Old Testament in the first chapter of the book of Ezekiel. There have been thousands of others recorded in various ways - such as the flying horses reported by both Roman and Greek civilizations. It is interesting to note that invariably the forms of UFO sightings over the last thousand years, have changed as civilization developed on earth. The seafaring people of the middle ages saw full-rigged ships sailing across the skies; the Greeks and Romans saw their flying horses and flaming chariots; today, the spheres and cylinders of space craft tend to be reported.

../2

21/6/66
(2)
MR Pope
DRD dept o/c
to Note & PA
DIS/OR
17/6/66

MESSAGE FORM

FILE DRBS 3800-10-1 (DMR)

FOR COMMCEN/SIGNALS USE

NUMBER 149

P.A.T. Note: SIF

PRECEDENCE - ACTION	PRECEDENCE - INFO	DATE - TIME GROUP	MESSAGE INSTRUCTIONS
~~XXXXXX~~ ROUTINE	DEFERRED	26 2143 Jan. 66	

FROM DEFENCE RESEARCH BOARD, OTTAWA.

TO ACCOMMODATING OFFICER, HMCS STADACONA, HALIFAX.

INFO

PREFIX GR

SECURITY CLASSIFICATION UNCLASSIFIED

ORIGINATOR'S NUMBER DRB 131

REQUEST SINGLE ACCOMMODATION FOR NIGHTS OF 31 JANUARY ~~XX~~ TO 3 FEBRUARY INCLUSIVE, FOR MR. N.O. FOTHERGILL OF DEFENCE RESEARCH BOARD HEADQUARTERS.

PAGE OF PAGES

REFERS TO MESSAGE

CLASSIFIED YES ☐ NO ☐

DRAFTER'S NAME OFFICE TEL.

N.O. Fothergill, Room 4421, "A" Bldg. 2-9295

FOR OPR'S USE		DATE	TIME	SYSTEM	OPERATOR		DATE	TIME	SYSTEM	OPERATOR	RELEASING OFFICER'S SIGNATURE
	R					D					

DND 903
7530-21-562-1556

COPY 4

164

DRBS 3890-10-1
DSI Ref: 0-481

Ottawa, Ontario.
15 September, 1964.

STF

Mr. [redacted]
Canadian Tungsten Mining Corporation Ltd.,
Watson Lake, Y.T.

Dear Sir,

Your letter of 24 Aug 1964 is hereby acknowledged. With reference to your observation, we have attempted with our local sources to identify your siting but without success. However, the Royal Canadian Air Force have offered to assist us in further investigating your report. You should hear directly from them in the near future.

Yours very truly,

Original Signed by
L. GUY EON

L. Guy Eon
for Chairman
Defence Research Board

√DRBC 3800-10-1 (PRO/
DRB)

174 Ottawa, Ontario,
29 October, 1958.

Vote SF

Major Donald E. Keyhoe,
Director, National Investigations
Committee on Aerial Phenomena,
1536 Connecticut Avenue,
Washington 6, D.C.

Dear Major Keyhoe:

Reference your request of October 17 regarding copies of UFO sighting reports recorded and analyzed by a Canadian Government advisory committee, may I suggest that you forward your request to Mr. W. Smith, of the Department of Transport, who is ex-officio Canadian Chairman of your organization. The majority of the sighting reports received by the advisory committee are passed eventually to Mr. Smith whom I am sure would be glad to help you.

While the reports received are not necessarily classified, I am informed the Department of National Defence is somewhat reluctant to make them directly available for examination because they include assessments of the individuals who originally report the sightings.

I understand that Mr. Smith is maintaining a continuing and active interest relative to UFO's and I feel sure he will be able to help you.

Yours sincerely,

ORIGINAL SIGNED BY
C. A. POPE

(C.A. Pope)
Public Relations Officer.

CAP/gm

CANADA

DEPARTMENT OF NATIONAL DEFENCE

DEFENCE RESEARCH BOARD

OUR FILE REF [illegible] 3800-10-1
YOUR REF: [illegible]-401

172

Ottawa, Ontario,
4 August, 1960.

Note SIF

Mr. [redacted]
Vancouver 12, B.C.

Dear Sir:

Thank you very much for your letter of 25 July. The Defence Research Board has indeed participated in Canadian investigations on UFO sightings, although not in direct charge of these investigations.

You may be interested to learn that the vast majority of reported sightings have been explained by known phenomena. The remainder have not supplied evidence that any threat to our country exists.

Yours truly,

(J.A.M. Lynch) Cdr.,
for ~~Director Scientific Intelligence~~

(3) DSI

This draft seems to cover the situation

5/8/60

100M-4-57(56-4024)

[illegible]-10-1

171

Ottawa, Ontario,
9 August, 1950.

Note SIF

[redacted]
Vancouver 10, B.C.

Dear Sir:

Thank you very much for your letter of 25 July which has been passed to this office for a reply. The Defence Research Board has indeed participated in Canadian investigations on UFO sightings, although not in direct charge of these investigations.

You may be interested to learn that the vast majority of reported sightings have been explained by known phenomena. The remainder have not supplied evidence that any threat to our country exists.

Yours truly,

for (C.A. Pope)
Public Relations Officer

CAP/pl

168 P.A. [redacted]
Top Secret
TD 1247 C (PRO/TRB)

Ottawa, Ontario,
13 September, 1961.

Note SIF

[redacted]
Humboldt, Sask.

Dear Sir:

The portion of your letter of 19 August to the RCAF requesting information about the present status of Project Magnet has been passed to this office for action.

Project Magnet is a United States scientific activity which involves a world-wide geomagnetic survey. Because this is not a project of the Department of National Defence but rather of a foreign country you will realize that this Department is not in a position to provide information. However, if you write to the US Navy Hydrographic Office, Washington 25, D.C., USA, requesting the pamphlet printed some time ago on this particular project, I am sure detailed information concerning this scientific endeavour will be forwarded to you immediately.

Yours sincerely,

ORIGINAL SIGNED BY
C. A. BOOT

(C.A. Boot)
Public Relations Officer

/cs

P.A. → DRBC 3800-10-1
Ref:DSL-A546

P.A. →

192

Ottawa, Ontario.
8 October, 1958.

Note.
SLT

Major Donald E. Keyhoe,
Director, National Investigations Committee
on Aerial Phenomena,
1536 Connecticut Avenue,
Washington 6, D.C.,
U.S.A.

Dear Sir:

Reference is made to your letter of August 18, 1958.

Since about 1947, sighting reports of unidentified flying objects were collected by various Government departments on a voluntary basis. In 1952 sightings became so numerous that the Defence Research Board decided to investigate the reports in some detail. Accordingly, an advisory committee comprising Service and Government departments was formed. A sighting report form was prepared for the use of anyone interviewing the observer of an unidentified flying object. Completed reports were recorded and analysed. In 1954 the Committee felt that most of the observational material did not lend itself to a scientific method of investigation. Accordingly, the Committee disbanded, and no further analysis has been carried out. Reports which have been received since that time, however, continue to be filed and recorded.

You are no doubt aware of the studies on UFO's being made by Mr. W. Smith of the Department of Transport, who is ex-officio Canadian Chairman of your organization. As the majority of sighting reports eventually fall into the hands of Mr. Smith, he would be the logical person to contact for information.

We do not know of any specific instructions to RCAF pilots regarding the reporting of UFO's.

ORIGINAL SIGNED BY
C. A. POPE

for Chairman, Defence Research Board

FILE COPY

DRBC 3800-10-1
Ref: DSI A-274

198

Ottawa, Ontario
22 April, 1958

Note: STF

Dr. I. Halliday,
Stellar Physics Laboratory,
Department of Mines & Technical
Surveys,
Dominion Observatory,
Ottawa, Ont.

Unidentified Falling Object

1. Herewith on loan are the reports on the object which fell near Granum, Alberta in the Spring of 1957. The RCAF have reported that there was no aircraft incident which could have had any connection.

(E.A. Bernard, S/L)
for Chairman, Defence Research Board

AB/ejm

DRBC 3800-10-1 (D Phys R (E))

197

Ottawa, Ontario.
26 November, 1957.

Note STF

Defence Research Member,
Canadian Joint Staff,
66 Ennismore Gardens,
London, S.W. 7, England.

Attention: Mr. A. Shore

Electromagnetic Propulsion

Reference is made to your letter of 20 November, 1957, requesting information on studies in electromagnetic propulsion undertaken by the Board.

Your memory serves you aright! The Board is not involved in any such project.

Original Signed by
D. R. HANSEN

(D.R. Hansen)
for Chairman,
Defence Research Board.

DHansen/JP
File
Diary

DRBS 200-4-160 (PRO/DRB)

212 Ottawa, Ontario.

12 April, 1954.

Note: slf

Mr. Edward J. DeKort,
255 Laidley Street,
San Francisco 12,
California, U.S.A.

Dear Mr. DeKort:

Your request for information about unidentified aerial phenomena has been passed to me. The publicity you saw recently in San Francisco dailies referred to the project discussed in the attached copy of a Time magazine story. The story outlined in some detail a project which has been set up by a Government department other than the Department of National Defence.

The Department of National Defence comprises the Royal Canadian Navy, the Canadian Army, the Royal Canadian Air Force and the Defence Research Board. The last-named carries out research and development for the three fighting Services. When the so-called "Flying Saucer" sightings began to be reported in the spring of 1952, the Committee mentioned in the second attachment was formed with Dr. P.M. Millman, of the Dominion Observatory, named as Chairman.

Following the Committee's formation, Service officers checked on sightings whenever possible and submitted detailed reports for the Committee's consideration. At no time have these reports indicated the existence of unusual celestial phenomena. Several sightings proved to have been caused by the flight of research balloons and several others reported appear to have been the descent of small meteors.

I hope this information will prove useful to you.

Yours sincerely,

(C. A. Pope)
Public Relations Officer.

CAP:sm
Atts.

225 PA → DRBS 200-4-160 (PRO/DRB)

Ottawa, Ontario.

28 January, 1954.

Note ↑ STF

Dr. P.M. Millman,
Stellar Physics Division,
Department of Mines and Technical Surveys,
980 Carling Avenue,
Ottawa, Ontario.

Dear Dr. Millman:

Our Mr. Oatway suggested a recent U.S. release on Cosmic Ray experiments might interest you.

Hence the enclosure.

Yours sincerely,

(C. A. Pope)
Public Relations Officer.

Encls.

P.A. [redacted] → DRBS 200-4-16.0

231

OTTAWA, Ontario.

22 April, 1953.

Note: STF

Mr. [redacted]
P.O. Box [redacted]
Lakeview, Ontario.

Dear Sir:

In answer to the inquiry contained in your letter of April 16, 1953, on the subject of "Flying Saucers", I wish to advise that your registered letter of April 8 referred to therein was received in this office on April 11.

The subject matter is now under consideration and you will be further advised in due course.

The delay in acknowledging your two communications is much regretted and I trust it has caused you no inconvenience.

Yours truly,

Chairman, Defence Research Board.

MLW/ch

240

~~CONFIDENTIAL~~

DRBC 260-4-43(Aero)

DEFENCE RESEARCH BOARD

PROJECT SECOND STOREY

Classification cancelled / Changed to Unclas.
By authority of DSIS
Date 25/5/84
Signature
Unit / Rank / Appointment A/DSIS

Minutes of the 4/52 Meeting
DRB Board Room, Ottawa
17 November, 1952.

Note SF

Chairman:	Dr. P.M. Millman	Dom. Observ.
Members:	Major D.M. Grant	D.M.I.
	Major F.B. Perrott	DMO & P
	S/L E.L. Howey	J.I.S.
	F/L W.B. Birch	D.R.B.
	Mr. W.B. Smith	D.O.T.
	Lt.Cdr. K.A. Stone	D.N.I.
Secretary:	Mr. H.C. Oatway	DRB

The minutes of the 3/52 meeting of the Committee were considered, and approved.

The Sighting Report and Information Form which was approved in draft at the last meeting, and subsequently reproduced and distributed, was given a final review. It was moved by S/L Howey, seconded by Major Perrott, that future forms should contain the heading "FOR OFFICIAL USE ONLY". This would prevent reproduction of the contents or reference thereto, in the press.)) SF

The reply to the letter from the Netherlands Military Attache was tabled and approved.

Mr. Smith reported on an experiment carried out under D.O.T. auspices in an endeavour to obtain data relative to the accuracy of reports. A large meteorological balloon, approximately twelve feet in diameter, to which was attached a thirty second magnesium flare, was released from the Experimental Farm at 2152 hours. EST on 8 September, 1952. No advance notice was given to the press. To date D.O. T. has not received any queries relating to this experiment. Mr. Smith agreed to forward a more detailed account of this experiment to the Secretary.

Mr. Smith table a draft "Weighting Factors for Analysis of Sighting Reports". This was reviewed briefly and, to allow for closer scrutiny, it was agreed that this draft should be distributed to the members as an appendix to the minutes. (Attached). There was some discussion related to the time required to apply these "weighting factors" to a given sighting report. It was considered that some revisions may be desirable in order to simplify marking procedures, and reduce the time requirement to not more than ten minutes.

Mr. Smith tabled examples of the Bulletins from the Civilian Saucer Investigation in the U.S.A. He agreed to reproduce the more pertinent of these for distribution to the Panel members.

F/L Birch distributed copies of a summary of the

S.21-1-9A TD#220 (DAI)

ROYAL CANADIAN AIR FORCE

294

Ontario,
18 August, 1952.

S/F

Mr. A.H. Moness,
P.O. Box 334,
Whitehorse, Yukon.

Dear Mr. Moness:

This is to acknowledge receipt of your letter of 30 July, 1952 and the enclosed clipping and translation. Your interest in this matter is greatly appreciated and the information has been passed to the appropriate branch of the Royal Canadian Air Force.

Yours truly,

G W Kusiar

(G.W. Kusiar)
Wing Commander
for Chief of the Air Staff.

1/
[redacted]

51/2421
19 SEP 1952

~~CONFIDENTIAL~~

DRBC 260-4-43(Aero)

Classification cancelled / Changed to Unclass
By Authority of DSIS
Date 23 May 84
Signature
Name / Rank / Appointment A/DSIS

DEFENCE RESEARCH BOARD

PROJECT SECOND STORY

Minutes of the 2/52 Meeting

CGS BOARD ROOM, OTTAWA
19th May, 1952

Note STF

Chairman:	Dr. P.M. Millman	Dom. Observ.
Members:	Lt. Cdr. J.C. Annesely	DNI
	S/L L.P.S. Bing	JIS
	F/L V.L. Bradley	DRB
	Maj.D.M. Grant	DMI
	Lt.Col. E.H. Webb	DMO&P
	Mr. W.B. Smith	DOT
Secretary:	Mr. H.C. Oatway	DRB

The Minutes of the first meeting of the Committee 24 April 1952 were considered and, with some minor changes approved. These have been reproduced and distributed.

A correction to the minutes of the general meeting 22nd April 1952 was tabled as follows:

Page 2, last para to read:

"It was decided that a Committee should be formed to give a lead in this activity and to standardize procedures, etc. Accordingly the following were nominated and agreed to act: Dr. Millman (Chairman) G/C Edwards, Lt. Col. Webb, Cdr Pratt, F/L Bradley, and Mr. W.B. Smith, and Mr. Oatway (Secretary).

This committee was to prepare a brief of instructions for observers; examine interrogation procedures and to get a consolidated and pertinent series of questions: "

With reference a communication from the Chairman of the Defence Research Board, Dr. Millman cautioned the members with respect to dealing with the press and public. The committee and all deliberations are classified as Confidential and must be so treated. Contacts with the press or public are not to be made.

Note STF

The last meeting considered that the name Project Theta would be desirable for this project and Committee, providing it would not duplicate an existing project name,

PA -) DRBS 200-4-160(Aero)

265

OTTAWA, Ontario
13 May, 1952

Note ↑ STF

Dr. J. H. Parkin,
Director,
National Research Council,
Montreal Road,
O T T A W A , Ontario

Dear Dr. Parkin:

Dr. Green has asked me to acknowledge receipt of your letter of the 7th May with the attached copy of a letter from Mr. [redacted] of North Gower concerning observation of a luminous object in flight in the sky on the evening of May 1st last.

While we get many letters referring to these unknown objects, it is a pleasure to get one so technically straight forward with very few embellishments. For your information, arrangements have been made with the Armed Services for receiving and analyzing such reports. Should further reports of this nature come to your attention it would be appreciated if you would forward them to the R.C.A.F , Attention: --Director of Air Intelligence.

Yours sincerely,

K. C. Salway

for Chairman, Defence Research Board.

CABLE ADDRESS "RESEARCH"

IN YOUR REPLY PLEASE QUOTE

FILE NO. M2-1-2

NATIONAL RESEARCH COUNCIL

CANADA

DIVISION OF MECHANICAL ENGINEERING

263

OTTAWA, 7 May, 1952.

Note STF

Referred to ...

MAY 9 1952

File No. ... -4-160

Card to 17/4

Dr. J. J. Green,
Chief of Division B, CD(B),
Defence Research Board,
Department of National Defence,
"A" Building, 125 Elgin St.,
OTTAWA, Ont.

Dear Dr. Green:

I am taking the liberty of referring to you the attached copy of a letter just received from Mr. [redacted] of North Gower, concerning his observation of a luminous object in flight in the sky on the evening of 1 May, last.

Yours sincerely,

J. H. Parkin,
Director.

JHP/hg
Encl.

303

DRBS 200-4-1-0

Ottawa, Ontario
2 June, 1952

Note ↗
STF

Miss [redacted]
[redacted] Boswell Avenue
Toronto, Ontario

Dear Miss [redacted]

Dr. Solandt has asked me to reply to your letter of 17 April 1952.

We thank you for your interest in reporting this matter and wish to advise that your letter has been passed to the Royal Canadian Air Force who will get in touch with you if they require further information.

Yours sincerely,

Chairman, Defence Research Board

VL

DEPARTMENT OF NATIONAL DEFENCE
MESSAGE FORM
FOR UNCLASSIFIED MESSAGES ONLY

INDICATE DEGREE OF PRECEDENCE

OPERATIONAL IMMEDIATE	
PRIORITY	X
ROUTINE	
IF NOT MARKED WILL BE TRANSMITTED DEFERRED	

FOR MESSAGE CENTRE USE ONLY

Same wire sent to -
PNL
SES
DRNL
CARDE
NRE
DRML

Scientific Information Division
2 OCT 1953

GR | UNCLAS

FROM: DEFENCE RESEARCH BOARD OTTAWA ONTARIO

TO: DREL KINGSTON ONTARIO

INFO

ORIGINATOR'S NO.: DRB # 3303

POSITION DIRECTOR DEFENCE RESEARCH PERSONNEL DEFENCE RESEARCH BOARD OTTAWA VACANT (.) PLEASE ADVERTISE AND INVITE APPLICANTS TO FILL POSITION IMMEDIATELY (.) MAIN QUALIFICATIONS DEGREE IN A SCIENTIFIC DISCIPLINE PREFERABLE (.) ADVISE ON MATTERS RELATIVE TO SALARY SCALES (.) KNOWLEDGE OF JOB EVALUATION (.) PRODUCTION OF APPROPRIATE ANALYSIS AND CHARTS (.) GOOD PERSONALITY (.) ABILITY TO HANDLE GENERAL PERSONNEL AND ORGANIZATIONAL PROBLEMS PARTICULARLY IN FIELD OF RECRUITING (.) ABILITY TO LIAISE WITH UNIVERSITIES (.) SALARY SEVEN THOUSAND TWO HUNDRED AND FIFTY DASH EIGHT THOUSAND AND FIFTY PER ANNUM DEPENDING ON QUALIFICATIONS AND EXPERIENCE (.) SUBMIT NAMES OF INTERESTED APPLICANTS BY TWO LETTER TO CHAIRMAN DEFENCE RESEARCH BOARD ATTENTION CHIEF OF ADMINISTRATION (.) PLEASE CONSIDER THIS AS URGENT (.)

DISTRIBUTION

CD(A)	D/CRD
CD(B)	DGS
CD(C)	DRP
CD(D)	JIB
DSIS	DRCL
DSI	DRTE

For information and necessary action please.

Note Date: STF

ORIGINATOR	TELEPHONE	DATE - TIME GROUP	FILE NO.
	5500	01 2123 OCT 53 Z	53-DRP-5-P

NS 1320J
AFR 1616 HQ 4554-8-1616. 1,700M-5-52 (5904)

REFERENCE COPY

8/10550 DRBS 7-0-240 (DSI)

M E M O R A N D U M

Ottawa, Ontario.
28 September, 1953.

Note Dates: STF

Secretary,
DRB

DSI Estimates

1. Reference DRBS 1-0-83 (DGS) of 21 July, 1953, and our recent conversation on the above subject.

2. May provision be made please in the Annual Estimates 1954-55 for an amount of $20,000 to cover DSI projects in connection with the exploitation of Russian literature.

3. It is intended to expand this activity into the following fields: (a) electronics, (b) CW and BW, and (c) arctic, scientific and technical capabilities. The equivalent of two qualified persons exploiting literature in each field will be required full time.

Original signed by
I. Bowen

(I. Bowen)
Acting Director
Scientific Intelligence

AFBS/FT

- D - C.J. Mackenzie
- Pres. Atomic Energy Board
- N.R.C. Suite

CONFIDENTIAL

DRBS 7-0-240

DEFENCE RESEARCH BOARD

Ottawa, Ontario
2 April, 1952

Note Date: ST

CD(C)

ATOMIC ENERGY INTELLIGENCE

With Wish

1. Before joining the staff at Chalk River somewhat over a year ago Dr. G.O. Baines was working for several years on atomic energy intelligence in the U.K.

2. Dr. Baines visits Dr. Dewar in Ottawa from time to time and has told us that he would be quite willing for us to put him back into the atomic energy intelligence picture so that he could give us the benefit of his previous experience providing, of course, that Dr. Mackenzie approved he spent (say) half a day with us on the occasions when he has to come to Ottawa on other business. Those occasions are not frequent and the amount of Dr. Baines' time taken up on intelligence matters would be small.

3. In view of Dr. Baines' rather extensive background of atomic energy intelligence, we think that he is likely to be of considerable help to us; also Dr. Mackenzie might not be averse to having an officer at Chalk River in the intelligence picture as well as Dr. Dewar in Ottawa. Perhaps you or CDRB might care to mention the above informally to Dr. Mackenzie to find out whether he would be willing for Dr. Baines to visit us occasionally and, if so, to have Dr. Baines notified officially.

CD(C) You speak to him CDRB 3/4

It might be useful to get Baines advice from time to time. No need for an official arrangement so long as C.S. is agreeable to him dropping into DRB when he is in Ottawa on other business. Will you speak to C.S. 3/4

A.J. Langley
Director of Scientific Intelligence

CONFIDENTIAL

DRBS 7-0-240

DEFENCE RESEARCH BOARD

P.A.

Ottawa, Ontario
2 April, 1952

Note Date: STF

CD(C)

ATOMIC ENERGY INTELLIGENCE

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Original Signed by
A. J. LANGLEY

A.J. Langley
Director of Scientific Intelligence

5/11/35

DRBS 7-0-240 (DSI)

P.A.

DEFENCE RESEARCH BOARD

Ottawa, Ontario
19 March, 1952

Note Date: STF

DRP

ATTENTION - Miss M. Foubert

DISTRIBUTION OF CHEQUES

1. Reference DRBC 1-0-320 (DRP) dated 7 March 1952.

2. I am authorizing Mrs. L.E. McManus of DSI to be responsible for the distribution of pay cheques as outlined in your above referred instruction.

3. A separate request is being made to DGS in regard to bonding.

Original Signed by
A. J. LANGLEY

A.J. Langley
Director of Scientific Intelligence

APL3/121

File

5/11/34 DRFS 7-0-210 (DGI)

DEFENCE RESEARCH BOARD

Note Date: STF

Ottawa, Ontario
19 March, 1952

D.G.

ATTENTION - Mr. P.J. Lucick

DISTRIBUTION OF CHEQUES - BONDING OF PERSONNEL

1. Reference DRB 1-C-101-9 (DGS) dated 28 February 1952.

2. We have been requested by DRP to appoint one person from DGI to be responsible for the distribution of pay cheques.

3. In this connection I am authorizing Mrs. L.E. McManus to undertake this task. Will you please arrange bonding to the amount of $1,000.

Original Signed by
A. J. LANGLEY

A.J. Langley
Director of Scientific Intelligence

AJL/LM

DRBS 2-0-172-3 (DSI)

File
51/1239

Ottawa, Ontario,
19 March, 1951.

Note Date!
STF

Miss W. Barnstead,
Director of the Library School,
University of Toronto,
371 Bloor St. W.,
Toronto, Ontario.

Dear Miss Barnstead:

The Defence Research Board is still without its Administrative Librarian and Head Revisor, but we are continuing the search and Robert Sale has been mentioned as a possibility for the Administrative position. Would you, therefore, we good enough to give us any pertinent information. We would appreciate any recommendations which you would care to make.

Yours truly,

Original Signed by
A. M. IRONSIDE

for Chairman,
Defence Research Board.

P.A. →

DRBS 2-0-172-3 (DSI)

DEFENCE RESEARCH BOARD

MEMORANDUM

5 February, 1951.

Note Dates: STF

Section Heads -
Directorate of Scientific Intelligence

ANNUAL REPORT

The attached is a copy of a memorandum issued by the Director on 12 September, 1950.

Will you please prepare a brief review of the activities of your section for the fiscal year 1950 - 1951. This report is required on or before March 1st, 1951.

(A.F.B. Stannard)
for Director of Scientific Intelligence

c.c. Mrs. P. Morin
Miss A.M. Ironside
Mr. Jones
Mr. Hope
Mr. Ross

SECRET 51-407

P.A. → DRBS 2-0-172-3 (DSI)

Ottawa, Ontario,
24 February, 1950.

Note Dates

Defence Research Member,
Canadian Joint Staff, London,
11 Hill Street, Berkeley Square,
London, W.1, England.

Channels of Communication with London, England
Distribution in NDHQ of War Office Scientific
and Technical Intelligence Reports.

1. Please see enclosed copies of memorandum from DSI to DMI dated 18 January, 1950, reference DRBS 2-0-172-3 (DSI) on the a/m subject. This refers to your letter DR 2/23 of 7/12/49.

2. DMI has now informed us that he is requesting the Army Member of the CJS to go ahead on the lines suggested in the attached memorandum, except that DMI will omit reference to M.I. 16 since that Section of the War Office is presumably disappearing, at least in its original form.

3. We now propose to go ahead here as opportunity occurs with a similar analysis for U.K., Navy and Air reports.

4. The principle guiding the distribution of these reports, which has now been accepted by the Services here, is that the Services will normally deal with Technical Intelligence, but will arrange to obtain sufficient reports so that one can be passed to DSI. In the same way DSI will normally deal with Scientific Intelligence but will pass one copy of a Scientific Intelligence report to the Services. This is because there is no hard and fast line between Scientific and Technical Intelligence and it will enable, for example, M.I. 10 here to keep in touch with Army Scientific Intelligence interests and, DSI to keep in touch with Army Technical Intelligence interests. It is emphasized that M.I. 10 will not normally work on Scientific Intelligence nor DSI on Technical Intelligence.

5. In consequence of the above we should be glad if you could arrange with the JSIC that we receive at least four copies or preferably 5 of the reports they issue.

L/j

(Encls)

(A.J.G. Langley),
Director Scientific Intelligence.

S-292

RESTRICTED
DRBS 2-0-172-3 (DSI)

P.A.

Ottawa, Ontario,
8 February, 1950.

Note Dates!
STF

Defence Research Member,
Canadian Joint Staff, London,
11 Hill Street, Berkeley Square,
London, W.1, England.

Defence Research Member,
Canadian Joint Staff,
1746 Massachusetts Ave., N.W.,
Washington 6, D.C., U.S.A.

Division of Scientific Intelligence - Broad Policy

1. The attached note on meeting held on 10 January, 1950, is forwarded for your information.

(att)

(A.J.G. Langley),
Director Scientific Intelligence.

L/j

SECRET

DRBS 2-0-172-3 (DSI)

Ottawa, Ont.,
18 January, 1950.

Note Date: JTF

DSI

Channels of Communication with London, England
Distribution in NDHQ of War Office Scientific
and Technical Intelligence Reports.

1. We have, in collaboration with your MI 10 officer, examined the distribution, etc. of certain War Office Technical and Scientific Intelligence material arriving in NDHQ, and the result appears to be as indicated in the list at appendix.

2. This investigation was started off by your Member and the Defence Research Member of the CJS in London getting together with DDMI(TS) on this problem as a result of which the Defence Research Member wrote to me asking:

(a) that we let both the Army and DR Member know the present distribution in Ottawa, and

(b) that we make any recommendations for modifications.

3. As regards 2(b) above, you will note, in the last column of the list at appendix, that I have suggested we ask for an increase of one in the number of Technical Intelligence Reports and Technical Liaison Letters received, and suggest a decrease of three in the number of MI 16 reports received. We have also inserted the suggestion (which London also made) that MI 16 reports should in future come through the Defence Research Member.

4. The proposed distribution will enable you to have one copy of Scientific reports in your files and us to have one of Technical reports, and will assist the close liaison already existing.

5. If you agree with the above, would you send one copy of the appendix to the Army Member in London, instructing him to request the War Office that in future three copies of Technical Intelligence Reports and Technical Liaison Letters be sent to you so that one copy may be provided for DSI. Would you also ask him to let the War Office know that the number of MI 16 reports and special Scientific reports for Canada can be reduced to three, requesting at the same time that they be forwarded in future through the Defence Research Member, London, to DSI, who will pass

P.A. → CONFIDENTIAL DRBS 2-0-172-3 (DSI)

Memorandum

Ottawa, Ont.,
16 January, 1950.

Note Dates: SIF

DAI (Attention: WO 2, Warman),
Room 2613 'A' Bldg.,
Ottawa, Ont.

DSI Filing of Scientific Intelligence

1. In accordance with your recent request, the attached instructions concerning DSI filing of Scientific Intelligence are forwarded for your information and retention.

(att)

~~DSI~~

/j

SECRET

DRBS 2-0-172-3 (DSI)

MEMORANDUM

Room 4310 'A' Building,
Ottawa, Ontario,
13 December, 1949.

Air Commodore C.W. Busk, C.B., M.C., A.F.C.
United Kingdom Air Liaison Mission,
Room 3024 'B' Building,
Ottawa, Ont.

Note Dates! STF

Defence Research Board - Scientific Intelligence Division
Organization and Functions

1. As requested two copies No.'s 27 and 28 of the a/m memorandum dated 9 November, 1949, are enclosed herewith. Please return receipt slip attached.

2. This memorandum was prepared primarily for the information of the U.S. Services Scientific Intelligence Sections in Washington and, in consequence, the wording is not entirely suitable for Canada or the U.K.; in particular it makes no mention of the liaison between this Division and the Joint Scientific Intelligence Committee in London.

3. As regards liaison with the U.K., the Scientific Intelligence Division here is authorized to deal directly with the Chairman of the JSIC in London via the Canadian Defence Research Liaison Officer in London.

(Encls.)

(A.J.G. Langley),
Director Scientific Intelligence.

L/J

DEPARTMENT OF TRANSPORT

INTRA-DEPARTMENTAL CORRESPONDENCE

2
2-50

QUEBEC, P.Q., 19 August, 1952.
PLACE DATE

84

YOUR FILE	SUBJECT	OUR FILE
22-12-29	Unidentified Aerial Objects.-	8117-2

SECRET FILE SEC.
22-12-29
AUG 22 1952
Transport Dept.

Note Date.

1708

The Director of Marine Services,
Department of Transport,
OTTAWA, Ont.

With reference to Circular Letter M.S.441, dated May 1st, 1952, the following information has been received from Mr. J.O. Gionet, lightkeeper at Caraquet, N.B.-

(a) cone-shaped object.

(b) brilliant white (aluminum).

(c) same size as a 45-gallon drum.

(d) 45° above horizon.

(e) from South to East.

(f) Nil

(g) Not reported.

(h) Between 1800 and 1900 hrs July 30th, 1952.

(G.E. Gaudreau),
Acting District Marine Agent.

22-12-29

CONFIDENTIAL

DRBC 260-4-43(Aero) 94

DEFENCE RESEARCH BOARD

PROJECT SECOND STOREY

Minutes of the 2/52 Meeting

CGS BOARD ROOM, OTTAWA
19th May, 1952

Note Date: STF

Chairman:	Dr. P.M. Millman	Dom. Observ.
Members:	Lt. Cdr. J.C. Annesely	DNI
	S/L L.P.S. Bing	JIS
	F/L V.L. Bradley	DRB
	Maj.D.M. Grant	DMI
	Lt.Col. E.H. Webb	DMO&P
	Mr. W.B. Smith	DOT
Secretary:	Mr. H.C. Oatway	DRB

Note: STF

The Minutes of the first meeting of the Committee 24 April 1952 were considered and, with some minor changes approved. These have been reproduced and distributed.

A correction to the minutes of the general meeting 22nd April 1952 was tabled as follows:

Page 2, last para to read:

"It was decided that a Committee should be formed to give a lead in this activity and to standardize procedures, etc. Accordingly the following were nominated and agreed to act: Dr. Millman (Chairman) G/C Edwards, Lt. Col. Webb, Cdr Pratt, F/L Bradley, and Mr. W.B. Smith, and Mr. Oatway (Secretary).

This committee was to prepare a brief of instructions for observers; examine interrogation procedures and to get a consolidated and pertinent series of questions: "

With reference a communication from the Chairman of the Defence Research Board, Dr. Millman cautioned the members with respect to dealing with the press and public. The committee and all deliberations are classified as Confidential and must be so treated. Contacts with the press or public are not to be made.

The last meeting considered that the name Project Theta would be desirable for this project and Committee, providing it would not duplicate an existing project name, or contravene regulations. The Secretary pointed out that the word "theta" has not been assigned to Canada under tripartite agreements. Additionally, if a single word name were used, it as well as the Committee deliberations, would be classed as Confidential and could not appear on interrogation forms which would be used to obtain data from the public. Any two-word name may be used openly and as such is known as a nickname. Nicknames may be used for classified projects. The Committee then agreed to the name "Project Second Storey".

28

CONFIDENTIAL

DEFENCE RESEARCH BOARD

OTTAWA, Ontario
30 April, 1952.

Note Date: JF

TO: Distribution.

1. The next meeting of the Committee which was set up to deal with "Flying Saucer Reports" will be held in the Defence Research Board Room at 0900 hours, May 6th, 1952.

2. Attached hereto is a copy of the questionnaire which resulted from the last meeting of the Committee.

3. With reference to the name "Project Theta" brought up at the last meeting, due to security regulations this name cannot be used in open literature. Also with this questionnaire form it will be necessary to use what is known as a nickname. Nicknames must consist of two words and cannot contain a colour. One nickname brought forth so far is "Hot Tomalley". Other suggestions are in order.

H. Oatway

(H.C. Oatway)
Secretary.

D I S T R I B U T I O N

Dr. O.M. Solandt	-	D.R.B.
S/L L.P.S. Bing		J.I.S.
F/L V.L. Bradley		D.R.B.
Col. G.M. Carrie		D.R.B.
G/C D.M. Edwards		D.A.I.
Mr. A.J. Langley		D.R.B.
Dr. P.M. Millman		Dom. Observ.
Cdr. J.C. Pratt		D.N.I.
Mr. W.B. Smith		D.O.T.
Lt.Col. E.H. Webb		D.M.O. & P.
Mr. H.C. Oatway		D.R.B.
Dr. Green		D.R.B.
Mr. Pope		D.R.B.
File Copy		

CABLE ADDRESS "RESEARCH" 1-9

IN YOUR REPLY PLEASE QUOTE

FILE NO.

SECRET FILE SEC.
22-12-29
APR 29 1952
Transport Dept.

NATIONAL RESEARCH COUNCIL
CANADA

RADIO AND ELECTRICAL
ENGINEERING DIVISION

26552

OTTAWA,

25 April, 1952.

Note Date: SIF

Mr. Wilbur B. Smith,
No. 3 Building,
Department of Transport,
Ottawa, Ontario.

Dear Wilbur:

Attached please find a short article on free flight balloons used with radar reflectors. This article is provided for you to use in your article on false flying saucer reports.

Yours very truly,

H. R. Smyth,
Head, Radar Dev. Section.

HRS:LB
Encl.

DEFENCE RESEARCH BOARD

Minutes of a Meeting to Discuss "Flying Saucers" Sighting, 22 April, 1952.

← Note Date: STF

Chairman: Dr. O.M. Solandt(DRB)

Present:
S/L L.P.S. Bing (JIS)
F/L V.L. Bradley (DRB)
Col. G.M. Carrie (DRB)
G/C D.M. Edwards (DAI)
Mr. A.J. Langley (DRB)
Dr. P.M. Millman (Dom. Observ.)
Cdr.J.C. Pratt (DNI)
Mr. W.B. Smith (DOT)
Lt.Col. E.H. Webb (DMO & P)

Secretary: Mr. H. C. Oatway (DRB)

The Chairman opened the meeting with a brief reference to the more frequent occurence of "Flying Saucer" sightings. The frequency and persistency of the sightings would tend to discount the theory of 'hallucinations'. This, coupled with an aroused public interest in these sightings, tended to call for a more active stand on the matter. At present the gathering of reports was rather haphazard and the reaction of the Services was passive. It is thought that a more active and intensive effort should be made to obtain these data on an organized basis, and all reports investigated and analysed. The objects of the meeting were then to determine if a more serious effort is justified and, if so, ways and means of implementing an organized effort. Organizations such as the Observer Corps might be enlisted for the job of sighting. If nothing else, this could serve as a useful training for the Corps. An examination of the theories might prove useful in giving a lead to the best locations for sighting. It was fortunate that proponents of the theories of terrestrial and extra-terrestrial origins were in contact with the D.R.B. and their data could be examined first hand.

The Air Force representatives then briefly outlined the work done by the USAF up to a year or so ago. As these efforts consistently resulted in 'nil returns' their project, in so far as the press and public were concerned at least, had been discontinued. Very recently, however, this investigation was re-opened , but is now classified.

In the discussions which followed, it was pointed out that precise and realistic details were lacking in all known reports. If observers such as the Rangers, watchers on ship board and the Observer Corps, which incidentally is really still in the paper organization stage, are to be enlisted some well planned guidance would be necessary. A small booklet illustrating typical celestial phenomena would result in more intelligent observation and eliminate many erroneous impressions. It was considered desirable to obtain information from U.S. interviews obtained under proper interrogation procedure, but to avoid the U.S. analysis of these

P.A. UNCLASSIFIED [redacted] 335

OTTAWA, Ontario.
14 December, 1954.

Note Date: ↑
STF

G/C D.M. Edwards,
VCAS/CPlans I/DAI,
Room 2536,
"A" Building,
Ottawa, Ontario.

Unidentified Flying Objects

1. Sightings of unidentified flying objects have been recorded in the Canadian Press since the turn of the century but it was not until about 1947 that the Services took more than casual notice of these sightings. Since that date, reports of sightings have been collected by various Government Departments on a voluntary submission basis. While these reports were reviewed the data presented never appeared to warrant a systematic and scientific analysis. In 1952, however, the sightings became so numerous that the Services agreed to take a really serious look at these phenomena. Accordingly, a Committee was formed under Defence Research Board auspices, the members representing the Services and a number of other Government Departments interested in the explanation of unusual phenomena observed in the sky. The terms of reference of this Committee were mainly advisory and no attempt was made to systematically collect data.

2. A sighting report form was prepared for the use of anyone interviewing the observer of an unidentified flying object. Instructions and notes concerning the use of this form were also prepared. An attempt was made to eliminate, as much as possible, the subjective element from the sightings. The majority of sightings reported have over-stressed irrelevant personal opinions rather than the straight-forward objective facts. Factors for assessing the reliability of any report were also suggested. To make possible the systematic recording of the most important facts of any sighting a form for card catalogue listing was designed, together with instructions for the filing of information from any sighting.

. 2

COPY

NORTH AMERICAN AIR DEFENSE COMMAND
Ent Air Force Base
Colorado Springs, Colorado

Office of the
Deputy Commander-in-Chief

13 December, 1957.

Note Dates: SIF

Chief of the Air Staff,
Air Force Headquarters,
Ottawa, Ontario,
Canada.

Standardized Canadian-United States Communications Instructions for Reporting Vital Intelligence Sightings (CIRVIS/~~MERINT~~)

1 On 4 Dec 56 the Canada-United States Joint Communications Electronics Committee (Can-US JCEC) approved a paper containing the Standardized Canadian-United States Communications Instructions for Reporting Vital Intelligence Sightings (CIRVIS/MERINT). Concurrence has now been obtained from all agencies concerned with the exception of the Department of External Affairs. External Affairs recently replied to a letter of inquiry from the Can-US JCEC stating that the document is under active consideration. It has been suggested by USAF Headquarters, and NORAD concurs, that a further inquiry from the Chairman Chiefs of Staff Committee might have the effect of expediting action on this important subject.

2 Attached is a draft letter to the Under-Secretary of State for External Affairs. It is requested that the necessary arrangements be made to have a letter, along the lines of this draft, forwarded to the Department of External Affairs through the Chairman Chiefs of Staff Committee.

(signed) C.R. Slemon

C.R. SLEMON
Air Marshal, RCAF
Deputy Commander-in-Chief

Your ref: 50219-0-40
DRBS 213-1-172 (DSI)

CONFIDENTIAL

6 October, 1952

Note Date
STF

Dear Mr. Wilgress,

The report by Mr. Kirkwood which you forwarded under cover of your letter of 5th September, 1952 has been read with interest.

Under paragraph seven of Mr. Kirkwood's report reference is made to the expansion of heavy water production capacity in France. If, in future visits, Mr. Kirkwood could get information on the method of production and annual output of heavy water in France it would be appreciated.

Yours sincerely,

ORIGINAL SIGNED BY
E.W. DAVIES

Acting Chairman
Defence Research Board

Mr. L.D. Wilgress,
Under-Secretary of State
for External Affairs,
Ottawa, Canada.

RESTRICTED

DRBS 213-1-172 (DSI)

DEFENCE RESEARCH BOARD

Ottawa, Ontario
3 July, 1952

MEMORANDUM TO MR. LANGLEY

1. Reference folio below, I visited the several officers in External Affairs, as arranged by Mr. Glazebrook.

2. In addition, I saw Mr. Watkins, who is Chief of the European Division.

3. All were cordial and seemed anxious to help in the procurement of intelligence for DSI. I left with each officer a copy of the attached outline of coverage of DSI.

4. In our talks, several of these officers asked what material DSI had that might be of interest to them. I offered to bring to their attention any reports we received, though I added that I felt most of them already went to External Affairs. (I shall glance through our list of significant documents received in DSI and bring to their attention papers of interest.)

D.R.H. Macdonald

DSI:

Mr. Hebert, of the International Conference Division of External Affairs, was approached today and will be pleased to cooperate.

R.H.M.

7/7/52.

SECRET

DRJIC 1485-1 (DSI)
DRBS 213-1-172 (DSI)

Ottawa, Ontario
13 June, 1952

Note date: JTF

Mr. G. de T. Glazebrook
Defence Liaison Division
Department of External Affairs
East Block
OTTAWA

Dear Mr. Glazebrook:

LIAISON WITH CIA

1. In accordance with Minute 22(b) of the 314th Meeting of the JIC, a list is attached giving details of intelligence items sent from this Directorate to CIA.

2. This list is sub-divided under the following headings:

(a) Reports
(b) Short memoranda and comments
(c) Intelligence items
(d) Intelligence items from interrogations in Canada
(e) Intelligence procurement apparatus
(f) CIA visits to DSI on scientific intelligence problems.

3. Not included in the list for security reasons are four intelligence reports sent directly to CIA and various special reports on atomic energy intelligence sent to the appropriate agency in Washington but presumably available to the nuclear energy division of CIA. It might be pointed out to CCOS that General Bedell Smith was probably unaware of a good deal of the material contained in the attached list and also of our atomic energy intelligence work which, alone, has been of very great value to the U.S.A.

Yours sincerely,

Original Signed by
A. J. LANGLEY

(A.J. Langley)
Director of Scientific Intelligence

AJL/L

CONFIDENTIAL

File 51/1 746

DRBS 213-1-172 (DSI)

Ottawa, Ontario
5 June, 1952

Note Date: ↑ STF

Mr. G. de T. Glazebrook
Defence Liaison Division
Department of External Affairs
Room 247
East Block, OTTAWA

Dear George:-

1. As I mentioned to you yesterday, we have felt from time to time that it would be very valuable for us to be able to consult informally the various Divisions in External Affairs concerned with the areas about which we happen to be working in Scientific Intelligence.

2. I am accordingly wondering if arrangements could be made for one of the officers here to be authorized to visit those Divisions dealing with Europe including the Red Bloc, the Middle and Far Easts and, of course, any other Divisions which you consider might be involved.

3. The sort of fields we cover are outlined briefly at Appendix: this outline can, of course, be expanded where required.

4. If the above arrangement can be made, I am suggesting that Mr. Ross Macdonald be the DSI officer who will normally visit External Affairs. Mr. Macdonald is of course fully cleared.

5. Conversely, if it is felt in External Affairs that consultations with us might sometimes be of use, we should be delighted to give any help we can and provide access for an External Affairs officer to any information we have here.

Yours sincerely,

Original Signed by
A. J. LANGLEY

(A.J. Langley)
Director of Scientific Intelligence

AJL/

SECRET 4335

DRBS 2-0-172-9 (DSI)

DEFENCE RESEARCH BOARD
Memorandum

Ottawa, Ont.,
17 February, 1950.

Note Date ↑

~~Sec~~ DRB
~~VDG~~
~~CDRB~~
DSI

Research and Development Board
Strategic Guidance

1. The attached papers EC 190/4 and EC 190/4.1, circulated by the Executive Secretary of the RDB may have a bearing on the strategic guidance adopted by the DRB.

2. Referring to paragraph 2 of EC 190/4, Intelligence here is at present unable to assess the significance of the "critical" date mentioned. It is presumably based on estimates for several years to come of the ratios of the capabilities of the US and USSR to produce and deliver atomic weapons; it is arguable, however, whether those ratios - even if correct - will have an over-riding influence on the probability of a shooting war starting.

3. The JIC is at the moment heavily engaged on "rush orders" in connection with the Atlantic Pact but, as soon as those orders are completed, a detailed study of Soviet long-term intentions and capabilities, which had to be interrupted, will be continued. It is already clear from the study that the USSR has in the future a number of differing courses of action open to it. The JIC is keeping an open mind about the probability of this or that course of action being adopted until the study has been completed. Meanwhile the DRB might consider the "critical" date assumed by the RDB to be a convenient one on which to base DRB research time schedules.

A.M. Langley
DSI

4454

SECRET

DEFENCE RESEARCH BOARD
Memorandum

Ottawa, Ont.,
9 March, 1950.

Note Date: ↑ SK

① ~~CDRB~~ OMS. 11/3

② VDG to note & discuss with me OMS.

Intelligence and Defence Research

1. The attached paper is not so much an Intelligence appreciation as an attempt to provide a broad view of the repercussions of Intelligence on Research policy.

2. The brief analysis in the paper - though appearing superficially elementary enough - is the result of a good deal of detailed working during the past year.

③ DS.T. Plse discuss with me on 3rd April

3. The conclusion is that there are, for us now, only two fundamental research projects of the highest importance.

4. If that conclusion is considered to have a sufficiently high degree of probability, it indicates, I imagine, some reshuffling of our Research effort.

5. No other copy of this paper has been circulated because I thought you might wish to discuss it before any further action is taken and, perhaps, before the Symposium.

④ VDG: You wished to take some action as indicated in para 4 of Appendix. 8/4/50

A.K. Langley.
DSI

⑤ RCS (Coord Control) This is the type of brief you may require. 11 Ap. RL 18/4/50

DIGS 2-1-173-10 (DNI)
CONFIDENTIAL

Ottawa, Ontario,
16 June, 1950.

Note Date: STF

Defence Research Member,
Canadian Joint Staff,
11 Hill Street, Berkeley Square,
London W.1, England.

For various reasons I have had only a very limited opportunity of briefing CDRB about my trip to the U.K. before he left here yesterday. I did, however, write some brief notes which he may have seen before he left or, if he did not, will be sent to your office so that he may read them in London. I would naturally be grateful if you would have a look at them too, and give him any further information that he may require.

I now enclose a couple of copies of a memo which might also interest the CDRB. I did notice on one or two occasions a slight tendency in London for people to wonder whether North America fully appreciated the sort of threat described in the memo under the heading of the U.K. unofficial "Pearl Harbour."

Yours sincerely,

A. J. G. Langley,
Director of Scientific Intelligence

CONFIDENTIAL
DRBS 2-1-172-10 (DSI)

DEPARTMENT OF NATIONAL DEFENCE
CANADA

DEFENCE RESEARCH BOARD

Ottawa, Ontario,
14 July, 1950.

Note Dates

VDG
CDRB

Defence Research - Strategic Guidance

1. The JIC paper CSC(20)50 attached, dated 13th July, 1950 on "The Imminence Of War" is, I think, important; it may well get to the Cabinet in one form or another.

2. The JIC itself has spent some nine hours preparing paper and it probably represents as good an appreciation of the situation as is possible, based on the intelligence available to the JIC.

3. Unless you or CDRB have inside information not presently available to the JIC, I think that the conclusions of CSC(20)50 outline the best bet for planning research at the moment.

4. These conclusions are plain enough and indicate clearly that consideration should be given:-

(a) To re-injecting a sense of urgency and realism into research programs

(b) Gearing programs as closely as possible to rapid development

(c) Pruning research frills and concentrating more effort on shorter term projects of immediate importance

(d) Placing saw-off dates when research projects should go into development.

5. Consequent upon the present international situation and in order to assist in reformulating research policy, consideration should perhaps be given to the sending of a DRB observer or observers to Korea.

A.H. Langley
D.S.I.

50M--5-47 (67)

P.A. UNCLASSIFIED 335

OTTAWA, Ontario.
14 December, 1954.

Note Date STF

G/C D.M. Edwards,
VCAS/CPlans I/DAI,
Room 2536,
"A" Building,
Ottawa, Ontario.

Unidentified Flying Objects

1. Sightings of unidentified flying objects have been recorded in the Canadian Press since the turn of the century but it was not until about 1947 that the Services took more than casual notice of these sightings. Since that date, reports of sightings have been collected by various Government Departments on a voluntary submission basis. While these reports were reviewed the data presented never appeared to warrant a systematic and scientific analysis. In 1952, however, the sightings became so numerous that the Services agreed to take a really serious look at these phenomena. Accordingly, a Committee was formed under Defence Research Board auspices, the members representing the Services and a number of other Government Departments interested in the explanation of unusual phenomena observed in the sky. The terms of reference of this Committee were mainly advisory and no attempt was made to systematically collect data.

2. A sighting report form was prepared for the use of anyone interviewing the observer of an unidentified flying object. Instructions and notes concerning the use of this form were also prepared. An attempt was made to eliminate, as much as possible, the subjective element from the sightings. The majority of sightings reported have over-stressed irrelevant personal opinions rather than the straight-forward objective facts. Factors for assessing the reliability of any report were also suggested. To make possible the systematic recording of the most important facts of any sighting a form for card catalogue listing was designed, together with instructions for the filing of information from any sighting.

. 2

COPY

NORTH AMERICAN AIR DEFENSE COMMAND
Ent Air Force Base
Colorado Springs, Colorado

Office of the
Deputy Commander-in-Chief

Note Date: STF

13 December, 1957.

Chief of the Air Staff,
Air Force Headquarters,
Ottawa, Ontario,
Canada.

Standardized Canadian-United States Communications Instructions for Reporting Vital Intelligence Sightings (CIRVIS/MERINT)

1 On 4 Dec 56 the Canada-United States Joint Communications Electronics Committee (Can-US JCEC) approved a paper containing the Standardized Canadian-United States Communications Instructions for Reporting Vital Intelligence Sightings (CIRVIS/MERINT). Concurrence has now been obtained from all agencies concerned with the exception of the Department of External Affairs. External Affairs recently replied to a letter of inquiry from the Can-US JCEC stating that the document is under active consideration. It has been suggested by USAF Headquarters, and NORAD concurs, that a further inquiry from the Chairman Chiefs of Staff Committee might have the effect of expediting action on this important subject.

2 Attached is a draft letter to the Under-Secretary of State for External Affairs. It is requested that the necessary arrangements be made to have a letter, along the lines of this draft, forwarded to the Department of External Affairs through the Chairman Chiefs of Staff Committee.

(signed) C.R. Slemon

C.R. SLEMON
Air Marshal, RCAF
Deputy Commander-in-Chief

CANADA

IN REPLY PLEASE QUOTE

SECRET

No. TS46-6-7/3 (CAW/ARM/D)

Department of National Defence

OTTAWA, Ontario,
30 January, 1950.

Chairman,
Defence Research Board,
Ottawa, Ontario.

Attention: Mr. A.W. Duguid

Note... Dates: ST

RCAF Pyrotechnics Standardization

1 At the third meeting of the pyrotechnics standardization Working Party 4(b)3, held in London, 24 October, 1949, it was established that five (5) copies of all minutes, or reports, on pyrotechnics would be forwarded to the RCAF Working Party Members.

2 Such distribution was established to include furnishing two copies to DRB, one copy for the CWEE and one copy for CARDE.

3 The two attached copies of:

CSAR Interim Report, Ref. AR 1107/1 dated 28 Oct, 1949 (No PP 639d 1 Dec/49) on the 8½" Photographic Flash Bomb.

are attached for your information and distribution.

4 May receipt be acknowledged on the duplicate copy of this letter please, and returned.

(C A Proctor)
Capt. USAF.
for C A S.

Accepted ack. 2.2.50.

RCAF G32B
200M—6-49 (5941)

IN REPLY PLEASE QUOTE

No. TS46-6-7/3 (CAW/ARM/D)
SECRET

CANADA

Department of National Defence

OTTAWA, Ontario,
2 February, 1950.

DRB file

Note Dates: ↑

STF

Chairman,
Defence Research Board,
"C" Building,
Department National Defence Hqs.,
Ottawa, Ontario.

Pyrotechnic Standardization

1 Members of Pyrotechnic Standardization Working Party 4(b)3, attended meetings and discussions in England during the period 10 to 24 October, 1949. A report has been prepared by the RCAF member of this Working Party.

2 Three (3) copies of this report are attached for your retention. It is believed desirable to have forwarded one copy to CARDE and one copy to CWEE.

3. May receipt of these copies be noted on the duplicate of this letter and returned, please, to CAW/ARM?

(C A Proctor)
Capt. USAF,
for CAS.

Encls.

RCAF G32B
200M—6-49 (5941)

CONFIDENTIAL

P.A. DRBS 2-0-172-3

Room 4310 'A' Building,
Ottawa, Ontario,
17 August, 1949.

Note Date: STF

The Secretary,
The Joint Intelligence Committee,
Privy Council,
East Block,
Ottawa, Ont.

Scientific Intelligence Division

Terms of Reference

1. Terms of reference for the Scientific Intelligence Division are under consideration by the Chairman of the Defence Research Board, and a draft is attached.

2. Before considering these terms of reference further, CDRB would be grateful for the views of the JIC on the above draft.

3. Would you accordingly please distribute copies of the draft to members of the JIC, with a suitable covering note, and place this item on the agenda of the next meeting.

L/j
(att.)

(A.J.G. Langley),
Director Scientific Intelligence.

CONFIDENTIAL

DEFENCE RESEARCH BOARD
MEMORANDUM

Room 4310 'A' Building,
N.D.H.Q., Ottawa, Ont.,
20 July, 1949.

CDRB

Note Date: STF

DSI

OK - asks JIC's views before taking to CSC. oml.

Scientific Intelligence Division - organization

1. The Division has grown sufficiently by now to begin to feel the disadvantage of not having official terms of reference, vis-a-vis the Service Intelligence Divisions: conversely, the Service Intelligence Divisions, whilst co-operating as much as they can are handicapped in that they have no official sanction for passing Intelligence Reports to us.

2. The JIB were in a somewhat similar position at the beginning of the year and have recently had tasks assigned to them approved by the Chiefs of Staff Committee. The JIB is, of course, under the operational control of the JIC so that the paper outlining the JIB's tasks was submitted to the Chiefs of Staff through the JIC.

3. I attach a draft outlining suggestions for a Directive concerning the Scientific Intelligence Division, and I should be grateful for your guidance

(a) As to the contents of the draft.

(b) As to whether you would prefer the draft as approved by you to go straight from you to the Chiefs of Staff Committee - as you are in operational control of the Scientific Intelligence Division - or whether you prefer that it went by the JIC.

4. The question of timing of course also arises in view of forthcoming changes in the Service Intelligence Directorates.

5. It may require careful consideration whether paragraph 6 of the draft is included, although if that were approved by the Chiefs of Staff we should be clear to make our own arrangements regarding liaison with the Scientific Intelligence Sections in London and Washington. This question is somewhat bound up with the forthcoming visit here of the Chief of the Intelligence Group of the Intelligence Division of the U.S. Army, about which a separate note is attached.

Ottawa, Ont.,
16 November, 1949.

Note Dates: STF Acted 11 Nov 49

Scientific Adviser,
Office of the Army Attache,
United States Embassy,
Wellington Street,
Ottawa, Ont.

Scientific Intelligence Division
Organization and Functions

1. Copies No.'s 6-20 of the a/m report dated 9 Nov 49, reference DRBS 2-0-172-3 are enclosed.

2. Would you please see that a dozen of these are distributed as necessary to the Army, Navy and Air Intelligence Departments in Washington.

3. Three additional copies are added in case the Army, Navy and Air Attaches in Ottawa wish to retain one copy for reference purposes.

4. In order to avoid the limitations imposed on Top Secret documents, the enclosed report has been written so as to fall within the Secret category: nevertheless we regard it as high up in that category, especially Appendices C and D, and would be grateful if it could be so treated and its distribution guided strictly by the "need-to-know" principle.

5. The agreed channels of communication between Washington and Ottawa for scientific intelligence are at present those already established between the respective Services.

(A.J.G. Langley),
Director Scientific Intelligence,
for Chairman, Defence Research Board.

L/j

File

DRBS 2-0-172-3 (DSI)

SECRET

Scientific Intelligence Division

Room 4310 'A' Building,
Ottawa, Ontario,
28 October, 1949.

Note Date: STF

The Director,
Communications Branch,
National Research Council,
Sussex Street,
Ottawa, Ont.

1. The attached memorandum is referred for information and retention.

2. Attention is called to Appendix C giving the official Terms of Reference of the Scientific Intelligence Division of the DRB.

(A.J.G. Langley),
Director Scientific Intelligence.

L/j

(att.)

P.A. → DRBS 2-0-172-3(DSI) (522)

CONFIDENTIAL

DEFENCE RESEARCH BOARD

Ottawa, Ontario,
11 October, 1949.

Note Date! ST

CNS
CGS
CAS

1. Three copies of Organization Chart of the Scientific Intelligence Division of Defence Research Board are attached.

2. You may care to forward two copies to your Director of Intelligence and, it is suggested, one copy might be of interest to your Liaison Member in Washington.

ACSC

for Chairman Defence Research Board.

(att.)

(37)

P.A. → DRBS 2-0-172-3(DSI)

SECRET

Ottawa, Ontario,
8 October, 1949.

SCIENTIFIC INTELLIGENCE DIVISION
(Foreign Intelligence Section)

Note Date: 5/F

Mr. A.L. Wright,
Defence Research Member,
Canadian Joint Staff,
1700 Massachusetts Ave., N.W.,
Washington 6, D.C , U.S.A.

1. Four copies of DRBS 2-0-172-3 of the a/m subject are forwarded herewith.

2. This note deals primarily with the Foreign Intelligence Section of this Division and your attention is particularly directed to its approved Terms of Reference as given at Appendix C.

3. Referring to paragraph 7 of Appendix C, the channel of communication between DSI and the U.S. Army, Navy and Air Intelligence Divisions will be until further notice through the normal Service channels between NDHQ and Washington.

4. The Chart showing the organization of the complete Division here (i.e. including the Scientific Information Centre and the Security Section) has been forwarded to you separately.

AJGL

(A.J.G. Langley),
Director Scientific Intelligence.

(Encls)

L/j

36

P.A. → DRBS 2-0-17[illegible]

Room 4310 'A' Building,
Ottawa, Ontario,
8 October, 1949.

Note Dates!
STF

Mr. R.A. MacKay,
Chairman, Joint Intelligence Committee,
Department of External Affairs,
Ottawa, Ont.

1. The attached note DRBS 2-0-172-3 dated 15 September 1949, is forwarded for information.

2. It deals mainly with the Foreign Intelligence Section of the Division, which has recently been consolidated, but at Appendix D the organization of the complete Division is charted.

3. The Scientific Information Centre shown on the right of the Chart deals with classified Scientific Reports on Defence Research carried out in Canada, the U.S. and the U.K. Some 10,000 such reports are now received annually.

4. The Scientific Information Centre is at present somewhat larger than the Foreign Intelligence Section. The total strength of the Division is about 35, of which about half are professionals.

AJL

(A.J.G. Langley),
Director Scientific Intelligence.

(att)

L/j

35

P.A. → DRBS 2-0-172-3(DSI)

(5706)

Room 4310 'A' Building,
Ottawa, Ontario,
8 October, 1949.

Note Date: 7/F

Mr. R.A. MacKay,
Head of Defence Liaison Division,
Department of External Affairs,
Ottawa, Ont.

Dear

I enclose a note describing briefly our Organization here. As Scientific Intelligence is comparatively new and not many people so far have had a chance of seeing what it is trying to do, I wondered whether you and the Secretary of the Joint Intelligence Committee might like to pay us a short visit sometime: we should certainly be very pleased to show you around.

Yours sincerely,

L/j

(34)

(5739)

SECRET

P.A. → DRBS 2-0-172-3

SCIENTIFIC INTELLIGENCE DIVISION

Ottawa, Ontario,
7th October, 1949.

Note Date. STF

United Kingdom Services Liaison Staff,
Truro Building,
Ottawa, Ontario.

Attention: Lt. Col. R.G.M. Stephenson

Dear

As requested, please find enclosed twelve copies of a Note on the Scientific Intelligence Division of the Defence Research Board. This Note was originally produced for the information of the Secretary of the Canadian Chiefs of Staff Committee.

Perhaps you would distribute two copies each to the U.K. Naval, Army and Air Missions here; they might wish to retain one copy each for information and forward one copy to their respective Intelligence Divisions.

The Note deals mainly with the Foreign Intelligence Section of this Division(which has recently been consolidated), but Appendix D gives a Chart of the Organization of the complete Division.

The Scientific Information Centre shown on the right of the Chart at Appendix D is at present rather larger than the Foreign Intelligence Section and deals mainly with classified Scientific Reports on Defence Research emanating from the U.K., the U.S. and Canada. Some ten thousand such reports are now received annually.

The total personnel employed at present in the Division is about thirty-five, of whom about half are Professional Staff.

(33)

Yours sincerely,

L/j

(A.J.G. Langley),
(Encls) Director Scientific Intelligence.

JOINT COMMUNICATIONS OFFICE 9421

~~SECRET~~ IN MESSAGE D.T.G.: 060600 Aug. 1947

~~SECRET~~ REC'D: 1200 EDT 9th Aug.

SECRET

FROM: A.M. LONDON

TO: PAYNEL CYPHER MESSAGE

AIX 6328 Aug. 6th 1947

Your AIX 14 July 29th.

During normal night flying practice at 2230 hours on 16th January, 1947, one of our Mosquitos was vectored in to an unidentified aircraft at 22,000 feet. A long chase ensued commencing over the North Sea about 50 miles from the Dutch coast and ending at 2300 hours over Norfolk. Two brief AI contacts were made but faded quickly. The unidentified aircraft appeared to take efficient controlled evasive action.

2. No explanation of this incident has been forthcoming nor has it been repeated.

ACTION COPY

I.C.M.

I.M.

C.I.O. (Action)

This page was referred to the USAF.

MESSAGE

DEPARTMENT OF THE ARMY
STAFF COMMUNICATIONS OFFICE

EMERGENCY

AF MSG

FROM: COMDR 64TH AD PEPPERRELL AFB NFLD

TO: DIR OF INTELL USAF WASH DC, ET AL

NR: ADOCC 16 042355Z SEP 53

Text on following page.

AF MSG

INFO: CSA, G2, G3

DA IN 805751 (5 Sep 53)

RECORD SECTION COR
Personnel Services Br

979 SEP 553

OCS FORM 375 1 AUG. 51 REPLACES OCS FORM 375, 1 MAR 51, WHICH MAY BE USED.

16 c

DEPARTMENT OF THE AIR FORCE
STAFF MESSAGE DIVISION
INCOMING UNCLASSIFIED MESSAGE

EMERGENCY JEPHQ JEDEN JKDAG EPAC JCPDC JFIC JEXW JENC JEOC JEZN.

DE JEXC 1 SEP 5 12 51 Z '53

Y 042355Z ZFF HQ. USAF

FM COMDR 64TH AD PEPPERRELL AFB NF

TO JEPHQ/DIRECTOR OF INTELLIGENCE HQ USAF WASHDC

JEDEN/CG ADC ENT AFB COLO

JKDAG/CG AACS ELMENDORF AFB ALA

EPAC/CO USNS ARGENTIA

JCPDC/CANAIRDEF ST HUBERT QUEBEC

JFIC/COMDR ICE DEFENCE KEFLAVIK ICELAND

JENC/COMDR 6602ND ABG HARMON AFB NF

JEOC/COMDR 6603RD ABG GOOSE AFB LABR

JEXW/COMDR 6610 ABG MCANDREW AFB NF

ZEN/COMDR 6600TH ABG PEPPERRELL AFB NF

ADOCC 16 ONE UNIDENTIFIED AIRCRAFT SIGHTED VISUAL AND GCA AT 48-0 8N 53-12W 04/2355Z OVERHEAD CYYT/HEARING NNW-/SAME AS C-47 100 K 3000 SIGHTED BY F/O CARTER RCAF MESSAGE RECIEVED THIS HEADQUARTERS AT 04/0400Z RESSARCHED FLT PLN TRAFFIC GCA CONTACT 15 SCTRD 15 VSBY/ A/C REPORLEDLY DROPPED GREEN FLARE PROCEED NORTH 12 MILES RETURNED HEADING SOUTH FADED ON GCA AT 15 MILES SOUTH REQUEST CHECK OF FLIGHT PLANS FOR POSSIBLE CORRELATIONPD 05/0142Z SEP JEXC

ACTION: OIN

INFO : OOP, OOP-CP, OAC, ARMY, NAVY, JCS, CIA, NSA, COMM CTR

CAR/aw

DEPARTMENT OF THE AIR FORCE
STAFF MESSAGE DIVISION

INCOMING UNCLASSIFIED MESSAGE

REC. STF. MSG. DIV.
SEP 5 04 50 '53
HQ. USAF

TMB046

JTA049

JEX B52

EMERGENCY JEPHQ JEDEN JKDAG BEPAC JCPDC JFIC 666

DE JEXC 5

Y 050320Z ZFF

FM COMDR 64TH AIR DIV DEF PEPPERRELL AFB NF

TO JEPHQ/DIRECTOR OF INTELLIGENCE HQ USAF WASHDC

ZEN/CG NEAC PEPPERRELL AFB NF

JEDEN/CG ADC ENT AFB COLORADO SPRINGS COLO

JKDAG/CG AAC ELMENDORF AFB ALASKA

BEPAC/CO USNS ARGENTIA NF

JCPDC/CANAIRDEF ST HUBERT QUEBEC

JFIC/COMDR ICE DEF FOR KEFLAVIK ICLD

ZEN/CC 6600TH ABG PEPPERRELL AFB NF

ADOCC 19 FLYOBRT EVALUATION: IT IS ASSUMED THAT THE OBJECT REPORTED AS A GREEN FLARE DROPPED FROM UNIDENTIFIED AIRCRAFT AT TORBAY AIRPORT AT 04/2355Z WAS PROBABLY A METEOR SEEN SIMULTANEOUSLY AT ARGENTIA BY GCI PERSONNEL ALSO DUE WEST OF THEIR STATION

05/0400Z SEP JEXC

ACTION: OIN

INFO : OOP, OOP-OP, OAC, ARMY, NAVY, JCS, CIA, NSA

EAN/vls

AFHQ FORM 0-309d
19 JAN 51
PREVIOUS EDITIONS OF THIS FORM MAY BE USED

16—68733-1 U. S. GOVERNMENT PRINTING OFFICE

HQD255

XTA099

JWPJN 2165

DEPARTMENT OF THE AIR FORCE
STAFF MESSAGE DIVISION
INCOMING UNCLASSIFIED MESSAGE

REC'D [illegible]
APR 3 22 [illegible]
HQ. USAF

EMERGENCY JEPHQ JEDEN 222

DE JWPMC 016

Y 032203

FM HAMILTON F/S CALIF

C JEPHQ/SEC DEF WASH DC /SECRETARY OF DEFENASE

JEDEN / CG AIR DEFENSE COMMAND ENT AFB COLORADO SPRING COL

CWPML/CG HAMILTON AFB HAMILTON CLIF

PAA 946 PSN30.5N 130.5W AT 2116Z 247 DEGREES 202K GND SPEED

SIGNED 3 SUBS AT PSN 305 1N 1293OW AT 2130Z APROX HEADING 070

DEGREES

03/2207Z APR JWPMC

DEPARTMENT OF THE AIR FORCE
AFF MESSAGE DIVISION

JEO B137

JEH A208

INCOMING UNCLASSIFIED MESSAGE

REC STF MGS DIV

APR 5 21 36 54

HQ USAF

EMERGENCY JEPHQ JEDEN JKDAG JCPDC JEOC 555

DE JEHC 59A

Y 052000Z

FM COMDR 6611TH AB GP NARSARSSUAK AB GRNLD

TO JEPHQ/DIRECTOR OF INTELLEGENCE HQ USAF WASHDC

JEXC/COMDR NEAC PEPPERRELL AFB NFLD

JEDEN/COMDR ADC ENT AFB COLORADO SPRINGS COLO

JKDAG/COMDR AAC ELMENDORF AFB ALASKA

JEHQC/CINCLANT

JEPAG/COMDR USNS ARGENTIA

JEXC/COMDR 64TH AIR DIV PEPPERRELL AFB NFLD

JCPDC/CANAIDRES ST HUBERT RUEBEC

JFICG/COMICEDEFOR KEFLAVIK ICE

JEHC/COMDR 6600TH AB GP PEPPERRELL AFB NFLD

JEHC/COMDR 6602ND AB GP ERNEST HARMON AFB NFLD

JEHC/COMDR 6603RD AB GP GOOSE AB LBR

JEHC/COMDR 6604TH AB GP MCANDREW AFB NFLD

JEHC/COMDR 6612TH AB GP THULE AB GRNLD

JEHC/COMDR 6624ST AB GP SONDRESTROM AB GRNLD

ATTN: COMMAND OPERATIONS CENTER PEPPERRELL

INT 1213 FOLLOWING INFT RECEIVED FROM DANISH LISION OFFICER THIS HEADQUARTERS PD QUOTE ONE ACFT OBSERVED OVER KAP BROER RYYS LOCATED AT 7332N 2036W AT 042015Z PD ACFT CAME FROM NE TO SW GRM MADE A TURN BACK TO NE PD RADIO CONTACT WAS TRYED FROM D-NIEBORG 7418N 2030W TO ACST GRM NO ANSWER PD ALSO STA. NORD APPROX LOCATION IS 8138N 1700W GRM HAD RADIO CONTACT WITH AN ACFT ON 0516Z PD UNQUOTE FLIGHT PLANS CHECKED THIS STA NEG INFO AS TO WHAT THEY MIGHT HAVE BEEN. PD PLEASE CHECK YOUR FLIGHT FOR INFO PD

05/2035Z APR JEHC

CONFIDENTIAL

ESSAGE

DEPARTMENT OF THE ARMY
STAFF COMMUNICATIONS OFFICE

HQS	
CLEAR	
DISPO	
P&S	
R&D	✓

CONFIDENTIAL
PRIORITY (BOOK MSG)

PARAPHRASE NOT REQUIRED
CONSULT CRYPTOCENTER BEFORE DECLASSIFYING
NO UNCLASS REPLY OR REF IF DTG IS QUOTED

FROM: COMNEACOM PEPPERRELL AFB NFLD

TO: CSUSAF WASH DC FOR AFOIN 2A1

NR: NEOIN 5313 081733Z JUL 55

ACTION COPY

Text on following page.

ACTION: AF, (ARMY G2)

INFO : G3

DA IN 152494 (12 Jul 55)

R/S

nls/12

FORM 375-2 REPLACES OCS FORM 375-2, 1 MAR. 51, WHICH [illegible]

CONFIDENTIAL

REPRODUCTION PROHIBITED

[redacted]

DDO UPDATE

AS OF 081400 EST NOV 1975

UFO SIGHTING

(U) From 080253 EST Nov 75 to 080420 EST Nov 75, Malmstrom AFB MT and four SAC sites reported a series of visual and radar contacts with unidentified flying objects. Several reports from the same locations included jet engine sounds associated with the observed bright lights. Two interceptors scrambled from 24th NORAD Region failed to make contact with the UFO's.

(U) The UFO sightings occurred on an extremely clear night. Visibilit was 45 miles. Although northern lights will cause phenomena similar to the received reports, weather services indicated no possibility of northern lights during the period in question. (SOURCE: NMCC MFR 080600 EST NOV 75.

[redacted]

DEPARTMENT OF NATIONAL DEFENCE
MESSAGE FORM
FOR UNCLASSIFIED MESSAGES ONLY

INDICATE DEGREE OF PRECEDENCE

OPERATIONAL IMMEDIATE	
PRIORITY	A
ROUTINE	
IF NOT MARKED WILL BE TRANSMITTED DEFERRED	

FOR MESSAGE CENTRE USE ONLY

Same wire sent to -
PNL
SES
DRNL
CARDE
NRE
DRML

Scientific Information Division
2 OCT 1953

OR UNCLAS

FROM DEFENCE RESEARCH BOARD OTTAWA ONTARIO

TO DREL KINGSTON ONTARIO

INFO

ORIGINATOR'S NO.
DRB # 3303

POSITION DIRECTOR DEFENCE RESEARCH PERSONNEL DEFENCE RESEARCH BOARD OTTAWA VACANT (.) PLEASE ADVERTISE AND INVITE APPLICANTS TO FILL POSITION IMMEDIATELY (.) MAIN QUALIFICATIONS CLAIM DEGREE IN A SCIENTIFIC DISCIPLINE PREFERABLE (.) ADVISE ON MATTERS RELATIVE TO SALARY SCALES (.) KNOWLEDGE OF JOB EVALUATION (.) EVALUATION OF APPROPRIATE ANALYSIS AND CHARTS (.) GOOD PERSONALITY (.) ABILITY TO HANDLE GENERAL PERSONNEL AND ORGANIZATIONAL PROBLEMS PARTICULARLY IN FIELD OF RECRUITING (.) ABILITY TO LIAISE WITH UNIVERSITIES (.) SALARY SEVEN THOUSAND TWO HUNDRED AND FIFTY DASH EIGHT THOUSAND AND FIFTY PER ANNUM DEPENDING ON QUALIFICATIONS AND EXPERIENCE (.) SUBMIT NAMES OF INTERESTED APPLICANTS BY TWENTY OCTOBER TO CHAIRMAN DEFENCE RESEARCH BOARD ATTENTION UNIT OF ADMINISTRATION (.) PLEASE CONFIRM THIS AS URGENT (.)

DISTRIBUTION

CD(A)	D/CRD
CD(B)	DGS
CD(C)	DRP
CD(D)	JIB
DSIS	DRCL
DSI	DRTE

For information and necessary action please.

Note Date: STF

ORIGINATOR	TELEPHONE	DATE - TIME GROUP		FILE NO.
	5500	01 2123 OCT 53	Z	53-DRP-5-P

NS 1320J

REFERENCE COPY

Admiral of the Fleet The Lord Hill-Norton G.C.B.

Fordingbridge (0425) 52392

CASS COTTAGE,
HYDE,
FORDINGBRIDGE,
HAMPSHIRE. SP6 2QH

2nd November, 1987

Timothy Good,
20 Morley Court,
78 The Avenue,
Beckenham, Kent,
BR3 2EY.

COPY

Dear Tim,

Thank you for your letter of 29th October.

To answer your questions first:

a. I could not, I fear, check on whether such a group as Majestic 12 did actually exist. I no longer know anyone who would be likely to tell me. It is just possible that Lord Zuckerman still has the right contacts and you might like to ask him, mentioning my name.

b. NATO documents always used the 0 in front of single date figures in my day but I do not know when it started. You should write to

The Head of NATO Information Service,
1110 Brussels,
Belgium

and ask them to look into it and tell you the answer. They ought to be able to find out. It is just possible that Field Marshal Lord Carver may be able to help. He served at Shape when it was still in Paris i.e. before 1966, but I am not sure when.

I shall be interested to hear the outcome. It seems entirely probable to me that the document is authentic, if for no reason other than I am unable to think of any plausible reason for it to be a forgery. Nor can I think of who might have done it, or successfully introduced it into the system. I very much hope that it can be resolved one way or the other. If the document is bogus, the reason for its existence would be interesting in itself.

I am delighted to hear that the book is selling so well. Next time you write let me know how many copies you have sold.

Yours sincerely,

Hill-Norton

COPY

Tel: 01-650 9476

8 Barry Court,
36 Southend Road,
Beckenham, Kent.
BR3 2AD

2 November, 1987

Dear Timothy,

Very glad to hear all is still going well with the book : I always thought it would do. Splendid news about Australia, but, whew ! what an exhausting programme for you. The worst part of book writing today is all the palaver and interviews which fall on one with publication. It makes one sigh for the good old days when all was more or less left to the newspaper and magazine critics. Of course, then one got a much better type of reviewer and more of them : the critics then actually told readers what a book was all about, whereas today one is left guessing. The modern critic is an an ego cruise, anxious only to show how clever or amusing he is.

You raise the query that the prefix "0" as in "02 July 1947" was not used until modern computer technology was developed. I beg most strongly to differ. Certainly my experience in wartime in the Navy was that the "0" was a vital prefix whether in the date as in "02 July" or the hour as in "0300". I should think such methods were still used in NATO. Mind you, I can only speak for British Naval techniques. I would suggest you could usefully check with the many CIA, White House, FBI, State Dept and NASA cables cited in the released files of those organisations which are to be seen in the London School of Economics Library. The place to look (and it doesn't take long) is in the indexes of subject matter relating to the material they hold. One has to join the Library for a period to be able to do this, but it doesn't cost anything. On the subject of MAJIC-12 I'm afraid I cannot help.

Have you had any feed-back from the French, because there you might learn a lot ? I only ask this question in the light of GEPAN and all that. I am at the moment writing a history of French Secret Service down the ages up to the present time, and in due course shall take a look at GEPAN and what has happened since. If I learn anything of value to you during my research, I shall certainly be in touch.

I have been hectically busy and travelling around these last several weeks, but I hope that life will

COPY

begin to get easier in the near future when I shall hope to arrange a meeting chez nous.

With all good wishes.

yours ever,

Donald

ORGANISATION DU TRAITE DE L'ATLANTIQUE NORD

NORTH ATLANTIC TREATY ORGANIZATION

TEL : 241.00.40 - 241.44.00 - 241.44.90 TELEX : 23-867

1110 - BRUXELLES

DIRECTION DE L'INFORMATION
INFORMATION DIRECTORATE

REF : DI.13(88)17
11 January 1988

Mr. Timothy Good,
20 Morley Court,
78 The Avenue
Beckenham
Kent BR3 2EY
England

Dear Mr. Good,

You wrote to me last November with one or two questions concerning Admiral Hillenkoetter and his time as Military Attaché to NATO. Curiously perhaps, NATO does not have a historical section which can deal with questions such as this. There used to be somebody in the Central Registry who had been with the headquarters for many years and whose institutional memory could be helpful on occasions such as this, but since her retirement that link has been lost.

I did pass a copy of your letter to our Central Registry to find out if they could throw any light on the matters you raised, but unfortunately they were unable to do so.

Yours sincerely,

Peter A. Jenner
UK Liaison Officer

COMMUNICATION INSTRUCTIONS FOR REPORTING VITAL INTELLIGENCE SIGHTINGS FROM AIRBORNE AND WATERBORNE SOURCES

JANAP 146(C)

THE JOINT CHIEFS OF STAFF
JOINT COMMUNICATIONS-ELECTRONICS COMMITTEE
WASHINGTON 25, D. C.
MARCH 1954

ORIGINAL

(REVERSE BLANK)

2-1, 2-9

THE JOINT CHIEFS OF STAFF
JOINT COMMUNICATIONS-ELECTRONICS COMMITTEE
WASHINGTON, D. C.

10 March 1954

LETTER OF PROMULGATION

1. JANAP 146(C) COMMUNICATION INSTRUCTIONS FOR REPORTING VITAL INTELLIGENCE SIGHTINGS FROM AIRBORNE AND WATERBORNE SOURCES, is an unclassified publication.

2. JANAP 146(C) COMMUNICATION INSTRUCTIONS FOR REPORTING VITAL INTELLIGENCE SIGHTINGS FROM AIRBORNE AND WATERBORNE SOURCES, is effective upon receipt and supersedes JANAP 146 (B), COMMUNICATION INSTRUCTIONS FOR REPORTING VITAL INTELLIGENCE SIGHTINGS FROM AIRCRAFT (CIRVIS) and all other conflicting instructions. JANAP 146(B) shall be destroyed by burning. No report of destruction is required.

3. The Military Services are permitted to copy or make extracts from this publication for military use without reference to the Joint Communications-Electronics Committee.

4. This publication may not be carried in aircraft, for use therein. Extracts of the message format and types of reports may be authorized by the U.S. Military Services for use in certain U.S. Aircraft, and Non-military vessels.

5. Coordination has been effected with the Air Coordinating Committee, other governmental agencies and commercial carriers.

6. This publication may be used by and distributed to certain U.S. Commercial facilities and U.S. agencies as specifically designated by any of the U.S. Military Services concerned.

Approved and published
by authority of the
JOINT COMMUNICATIONS-ELECTRONICS
COMMITTEE
Washington 25, D. C.

Andrew D. Stephenson (Signed)
ANDREW D. STEPHENSON
Colonel, USA

Dave C. Tansel (Signed)
DAVE C. TANSEL
Major, USAF

Secretaries

ORIGINAL

CHAPTER III

MERINT REPORTS

SECTION I - GENERAL

301. INFORMATION TO BE REPORTED AND WHEN TO REPORT

a. Sightings within the scope of this chapter (as outlined in Article 102b., (4), (5), (6), (7) are to be reported as follows:

(1) Immediately (except when within territorial waters of other nations as prescribed by international law)

(a) Guided Missiles
(b) Unidentified flying objects
(c) Submarines
(d) Group or groups of military vessels
(e) Formation of aircraft (which appear to be directed against the United States, its territories or possessions)
(f) Individual surface vessels, submarines, or aircraft of unconventional design, or engaged in suspicious activity or observed in an unusual location or following an unusual course.

(2) When situation changes sufficiently to warrant an amplifying report (see Art. 409)

302. SIGHTINGS NOT TO BE REPORTED

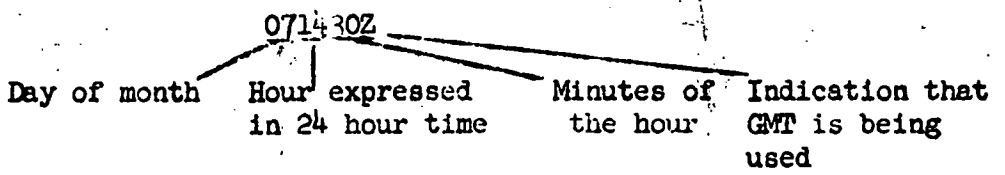
a. Surface craft or aircraft in normal passage.
b. Known U.S. Military vessels including submarines.
c. Known U.S. Government vessels.
d. Known U.S. or Allied Military Aircraft.

303. CONTENTS OF MERINT REPORTS

a. MERINT reports shall comprise the following, as applicable, in the order listed.

(1) "MERINT" will always be the first word of the text.
(2) Ship's position at time of sightings (except in wartime when other instructions apply)
(3) Nature of sighting employing (a), (b), etc., as shown in para 301.
(4) Direction of sighted object(s) travel.
(5) Observations of aerial sighting the altitude expressed as Low Medium (Med) or High.

(6) The date and time of the sighting, expressed by the use of six digits and the time zone suffix. The first two digits denote the date, the second two digits denote the hour and the third two digits denote the minutes of the hour. Greenwich Mean Time (GMT), must be used in all instances, and shall be indicated by the use of GMT or by the addition of Z to the date time group, i.e.:



(7) Name of Ship and/or call letters

SECTION II - PROCEDURE

304. GENERAL

Communication procedures to be employed will be basically those prescribed for the communications system or service used. Merchant ships will employ normal international commercial communication procedures. Every effort will be made to obtain a receipt for each MERINT message transmitted. U.S. public vessels which are manned by military or civil service personnel will use military communication procedure.

305. PRECEDENCE (PRIORITY OF TRANSMISSION)

Transmission of MERINT reports will be preceded by or include the international "Urgency Signal", military precedence of "Emergency" or "Rapid U.S. Government" as appropriate for the communications means, system or service employed.

EXAMPLE

International Urgency Signal XXX XXX XXX or PAN PAN PAN	
Military precedence Y or Emergency	
Commercial class of Service Indicator)	RAPID US GOVT (to be used only when refiled with commercials companies)

306. ADDRESSING

a. The Department of the Navy is responsible for the promulgation of extracts from this publication, commercial communication companies and operators and for Masters of vessels indicated in para 102b (4), (5), (6) and (7) with such additional postal and registered cable address information as may be required to insure expeditious handling of MERINT reports over commercial facilities.

JANAP 146 (D)

CANADIAN - UNITED STATES COMMUNICATIONS INSTRUCTIONS FOR REPORTING VITAL INTELLIGENCE SIGHTINGS

(CIRVIS/MERINT)

JANAP 146

THE JOINT CHIEFS OF STAFF
JOINT COMMUNICATIONS-ELECTRONICS COMMITTEE
WASHINGTON 25, D. C.

February 1959

ORIGINAL
(REVERSE BLANK)

(10) Conditions of sea and weather.

* "071430Z" is an example of a complete date-time group (DTG). When broken into component parts (07) is the day of the month, followed by (14) the hour in 24 hour time, followed by (30) the minutes of the hour, followed by (Z) the time zone. "Z" signifies that Greenwich Mean Time has been used in composing the date-time group.

Day of Month	Hour Expressed in 24 hour time	Minutes of the hour	Indication that GMT is being used.

EXAMPLE of a Radiotelephone Transmission:

MERINT MERINT MERINT - WHISKEY ZULU TANGO -THIS IS KILO HOTEL WHISKEY MIKE - OVER
KILO HOTEL WHISKEY MIKE - THIS IS - WHISKEY ZULU TANGO - OVER
WHISKEY ZULU TANGO - THIS IS = KILO HOTEL WHISKEY MIKE
MERINT SS TUNA KILO HOTEL WHISKEY MIKE SIGHTED FORMATION OF SIZ JET BOMBERS LAT 40N 50E AT 211500Z ALTITUDE MEDIUM HEADING 270 DEGREES TYPE OF AIRCRAFT NOT OBSERVED BEFORE WIND FORCE 3 SEA CALM -
OVER

EXAMPLE of a Radiotelegraph Transmission:

MERINT MERINT MERINT CFH DE KHWM K
KHWM DE CFH K
CFH DE KHWM
"RAPID U S GOVERNMENT" or CANADIAN "RUSH"
MERINT (REMAINDER OF TEXT)
211513Z JONES KHWM
K

305. Additional MERINT REPORTS. -

a. Amplifying Reports. -

(1) When additional information becomes available to any observer and is of importance, it is to be transmitted as a "MERINT AMPLIFY" report.

(2) Amplifying reports are to be handled in the same way as the original report except that the first two words of the text will be "MERINT AMPLIFY" followed by the date and time of filing of the MERINT report being amplified.

(3) Amplifying reports on aerial objects normally consist of additional information pertaining to the sighted object's size, shape; description of jet or rocket streams; color, sound; if multiple objects, the number; type; method of propulsion; number of engines; insignia and estimated speed.

TOP SECRET

9 June 1954

Memorandum for the Chairman, Joint Chiefs of Staff:

Reference: Your Top Secret Memorandum of 7 June 1954 addressed to Chief of Staff, U.S. Army, Chief of Naval Operations, and Chief of Staff, U.S. Air Force, on subject of French plan to activate 3 Reserve Divisions.

1. Your memorandum gives only some of the salient facts.

2. The salient facts omitted are:

a. SACEUR in his 2 June message stated:

"Unless this letter reveals some new facts not apparent from the outline of the plan presented by General Vernoux, I propose, unless you instruct me otherwise, to inform the French Government that I offer no objection to the implementation of this plan".

b. You stated orally to the Chiefs of Staff that you intended to withhold dispatch of the radio reply to SACEUR, unanimously agreed to by the Chiefs of Staff, until you had contacted the Secretary of Defense and the Secretary of State.

c. It was made clear to you both by me and the Chief of Naval Operations that this action, if taken, might completely nullify the unanimously approved action of the Chiefs of Staff, since the time required for you to contact the authorities mentioned was indetermined.

d. At the insistence of the Chief of Staff, U.S. Army, and the Chief of Naval Operations, based on the foregoing reasoning, you agreed that if you were unable to contact the authorities mentioned and get their clearance by 051800 EDT June 1954, you would dispatch to SACEUR by radio the instructions which the Chiefs of Staff had unanimously approved.

3. The foregoing gives a more accurate and adequate picture of what transpired than the memorandum you furnished me.

(SGD) M. B. RIDGWAY

M.B. RIDGWAY
General, United States Army

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TOP SECRET

Copy No. 2 of 5 copies

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STANTON T. FRIEDMAN
NUCLEAR PHYSICIST - LECTURER
79 PEMBROKE CRESCENT
FREDERICTON, NEW BRUNSWICK E3B 2V1
CANADA

(506) 457-0232

Mr. William Westernman
1801 Lincoln Blvd.
Apt. 262
Venice, CA 90291 USA

June 12, 1989

Dear Mr. Westernman:

The editor of the International UFO Reporter has sent your letter of May 17, 1989 along to me.. presumably because I have published articles about MJ-12 and long ago (as these things go) took care of Mr. Klass's silly and incompetent arguments... silly because there is overwhelming evidence that he doesn't know what he is talking about on every aspect of the MJ-12 Controversy... ("The MJ-12 Debunking Fiasco")

I am enclosing my "Debunking a Debuker" piece which was published by IUR along with a piece on the Pica Type Fiasco... I knew that Klass had spoken at UCLA. I sure would like a tape of the program, if you know where I can get one...

The simple facts are that there are many examples of the use of many different date formats.. including by Roscoe Hillenkoetter himself... and also, as just obtained, by Walter Bedell Smith, who succeeded Hillenkoetter as CIA head and was also listed as one of MJ-12 . Mr. Klass has never been to the Truman or Eisenhower Libraries and has spent very little time at the National Archives, nor to the best of my knowledge at the Library of Congress... The NSC alone produced well over 1/4 million pages of materia during the Ike era. There were many typists, many people writing memos.. many typewriter many formats for dates, memos and everything else. Klass tried to generalize about PICA type on the basis of 9 items!! as though one person typed all the NSC materials on one typewriter!!!. There were also many security markings.. some seldom used.

Just as with all other Klass arguments.. none stand up under careful scrutiny.. all sound great until there is a confrontation with the data... like Air Materiel vs Material, like Roscoe's not using Roscoe, etc ad nauseum...I wonder if Klass tried to use the Pica type argument???? (at UCLA)

"Unauthorized comma" is a wrong statement... as you will note B. Smith used 4 different (including the "wron date formats. I do not yet have any 1952 Briefings from the CIA .. by Smith or earlier by Hillenkoetter..but I am working on it... do note the examples in my paper....

A key thought is "Absence of Evidence is not evidence of absence....It would be a little like claiming, because I cannot produce or demonstrate an H-bomb, that no such devices exist...

I do trust you are aware that Hillenkoetter (and Smith as well) spent loads of time outside the USA and that the "wrong" date format is often used overseas..

Anyway, I appreciate your writing (I am presuming you haven't read my 6 MJ-12 articles rather than merely accepting Klass's phoney arguments.. be assured he has copies of my papers...I would expect that the briefing probably was prepared at the CIA since Bedell Smith had been asked by Truman to brief Ike about national security matters duri the campaign.. Surely someone in his office had a need to know for Majic material (1952) during Hillenkoetters years in the same office.
Incidentally, Moore has also used many date formats... selective choice of data is a Ha mark of the Klass anti-UFO fantasies....
Most cordially, Stanton T. Friedman

Stanton T. Friedman

1801 Lincoln Blvd.
Apartment 262
Venice, CA 90291

LETTERS TO THE EDITOR

17 May 1989

Dear Letters Editor:

Phil Klass is the arch-enemy of ufology, yet even he seems once in a long while to stumble on something that could be important, even if by trial and error. Last night I went to a CSICOP lecture at UCLA by him, and while I disagreed with 95% of what he said, he did manage to bring up what could be a valid point.

Discussing MJ-12, he pointed out that the use of the date "07 July,1952" would be not correct for the style of the day, using military and goverment papers. The right style was "7 July 1952" and I have Air Force papers from the later 50's that show this to be true. Later, of course, due to computers, the style of "07" or "09" etc, got in vogue, and still is the case. Also, the military never did, and still doesn't use the comma after the month - at all. I used to write goverment letters, and the style and method tends to stick with one.

Thus, it would seem logical that somebody with some sort of 60's, 70's or 80's military or goverment backround wrote the MJ-12 letters, and did not write them in the 50's. Furthermore, it would seem to be a personal quirk to use the unauthorized comma, maybe a disaffected civilian, or ex-military.

This isn't all - Klass also then proceeded to show military and goverment letters from the 50's and then letters from a later period. The diffrences in date-styles were plain. Then he showed slides of letters from UFOlogist Bill Moore. All of these had the style of "07 July,1952" but with modern dates. The comma was featured in all of them. The extra zero as well.

Does IUR or Bill Moore have an answer for this? I can't come up with one.

yours, Bill Westernman

devise your intelligence system so it was impossible to write an unclear date? The best way to indicate that you intend a single, not a double, digit is to use two digits at all times and, should there be no first digit, to so indicate with an unmistakable symbol. It is very hard to make a zero look like anything but a zero, so why not use that symbol to signify that a single digit follows? Just to make doubly sure that no one can read your zero as the letter "O," why not slash through all zeroes? (Eg.: ∅). A slashed zero simply cannot be mistaken for anything but a slashed zero. Finally, to make triply sure, would you not require the use of the clarifying zero at all times rather than allow it be be optional?

This is exactly the European method -- at least it was in the sixties. I believe if you check, you will see it is a NATO practice, as well. If you check still further (there must be an FOI-obtainable procedural manual around somewhere), I think you may find this is a standard, common sense procedure for all hand-written U.S. intelligence records. It predated computers because it had nothing to do with computers. It had to do with guarding against the sort of ambiguity found in hand-written numerals.

Regarding Executive Orders, do some research on their legal function and purpose. I believe you will find that, far from the informal, memorandum-style communications Mr. Klass suggests they are with his proto-Truman prose, Executive Orders are intensely formal documents which, over the signature of the President of the United States, carry the force of federal law. To challenge them, I believe one must go to federal court on constitutional grounds. It is my understanding that Presidents use Executive Orders to circumvent Congress when:

(1) An issue is too hot politically to approach legislatively (for example, the Executive Order creating regional Councils of Government [Presidential Order 12372, 1966, I think] for intergovernmental review of federal programs); or,

(2) An issue is too sensitive for public debate (for example, the exchange of arms to Iran in return for the release of western hostages in Beirut).

I was struck myself by Mr. Klass's anomalous rendering of Executive Orders when I first read his piece in the Skeptical Inquirer and bemused by his assertion that Mr. Truman would have created a federal fiat containing colloquialisms and profanity.

Finally, I am a little surprised that you have not seemed to notice the disinformative nature of what you claim Mr. Klass is doing. If Mr. Klass is, indeed, deliberately spreading disinformation in a way similar to that Mr. Menzel allegedly once did, perhaps you should inquire a little more perceptively into the background, funding sources, and connections of this Washington-based commentator.

These are just my inexpert observations -- I am no authority either in federal law or intelligence operations.

Sincerely,

R. McCann

2476 Glenwood Avenue
Toledo, Ohio 43620
September 14, 1988

Mr. William Moore
4219 West Olive Street, Suite #247
Burbank, CA 91505

Dear Mr. Moore:

My husband is a subscriber to the Skeptical Inquirer. As a result, I have had occasion to follow Philip Klass's commentary on the "MJ-12" documents. I like to think that, in my own enchanting way, I am an open-minded person. Thus, I acquired a copy of the "MUFON Symposium Proceedings" to see what you folks might have to say in response.

Your frustration and outrage at Mr. Klass are thoroughly apparent and, I must concede, you do seem to have some grounds for objecting to certain points of his style, method, research, and presentation. However, as an independent reader (and an editor/publisher by profession), I suggest to you that your presentation would be quite a bit stronger were you to stop responding to his vitriol with your own invective. I know that can seem a cruel criticism when someone is continually referring to you in public as an incompetent fraud. BUT observations regarding his style, methods, etc., should have appeared exactly once -- at the close of the article -- as a sort of coup de grâce. A dispassionate, complete exposition of Klass's alleged numerous errors would have lent dignity and force to the piece. The way it stands now, the lingering impression left with the casual reader is that a personality conflict is at hand, rather than a credibility question based on quality of research. I do not think that is what you meant to convey.

Now I do not know whether or not the documents you have are genuine, but let me put forward a thought or two you might explore to help sift through the matter for yourself. (One thing I noticed by comparing the Moore-Klass exchange is your willingness to test your own information as opposed to his reflex assumption that his points consist of revealed wisdom. His are arguments by social authority; yours seem to be arguments by data, which is why I thought you might appreciate some constructive criticism.)

Be that as it may, I used to work and live in Europe. I prominently noticed, therefore, the question regarding the use of "0" before single-digit dates and whether it was a common practice before the advent of computers. Especially in European cursive, single digits can easily be mistaken for double digits. The worst offender is the numeral "7." The way Europeans write it, it can look very much like "17." Similarly, a "2" can look like a "12." Examples:

Seven or Seventeen?:  Two or Twelve?: 

Suppose, now, you are dealing with sensitive intelligence data. Suppose most of your operatives are filing hand-written reports. Suppose further that you are dealing with situations in which an error of ten days can literally mean someone's life. We quickly see that the question revolves around issues of clarity, not the logistics of computer technology.

Let us suppose a little further. In the interests of clarity, would you not

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HEGEMAN-HARRIS COMPANY
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NEW YORK 20, N.Y.

TELEPHONE COLUMBUS 5-7262

September 19, 1963

Doctor Donald H. Menzel
Harvard College Observatory
Cambridge 28, Massachusetts

Dear Dr. Menzel:

Please accept my deepest apologies for the delay in answering your letter of 2 August, as well as the acknowledgment of the receipt of your book. I was away for some time during the summer and the Navy Department forwarded your letter to my home where I was a long time receiving it.

Thank you very much for your book. To my mind, it was very well done and I enjoyed it and found it of great interest. I should say that you have effectively put to rest all surmises about flying saucers being from "outer space". You have done a thorough and praiseworthy job.

As I told you at the last "Ends of the Earth", I resigned from NICAP about 20 months ago feeling that it had degenerated from an organization honestly trying to find out something definite about possible unknowns, into a body bickering about personalities. The Air Force, too, could have helped by not being so secretive.

At all events, you have done a fine job and I am very grateful you were so kind as to send me your book.

Again with thanks and the hope of seeing you at the next "Ends of the Earth", please believe me

Most cordially,

R. H. Hillenkoetter
Vice Admiral, U.S.N. (Ret.)
Vice President

AMP

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ADM. HILLENKOETTER DENIES MENZEL CLAIM

In a recent Chicago broadcast, Harvard astronomer Donald H. Menzel -- an often violent attacker of UFO witnesses and believers -- made the following claim in regard to Vice. Adm. R. H. Hillenkoetter, former NICAP Board Member:

"Adm. Hillenkoetter has read my book [The World of Flying Saucers] and has told me he fully accepts all my explanations." (Dr. Menzel rejects all positive evidence, insists UFOs are only natural phenomena, errors in identifying planes, meteors, etc.)

Dr. Menzel's statement apparently was an attempt to discredit NICAP, after an Affiliate member quoted Hillenkoetter as holding a contrary view.

The first time Menzel made this claim, as far as we know, was on Boston station WEEI, late in 1964. Adm. Hillenkoetter was already on record, in a signed Board Member statement, as stressing the UFO problem's importance, the risk of accidental war from mistaken identification of UFOs as a secret Soviet attack, and the urgent need for a Congressional investigation. Since a complete reversal of these views was incredible, NICAP's director, a Naval Academy classmate and personal friend of Hillenkoetter, wrote him about the Menzel claim.

Adm. Hillenkoetter's reply is reproduced below. (The reference to Maj. Hart was not concerned with Menzel.)

January 8, 1965

Maj. Donald E. Keyhoe, USMC (Ret.)
National Investigations Committee
On Aerial Phenomena
1536 Connecticut Ave., N. W.
Washington 6, D. C.

January 8, 1965

Dear Don:

I apologize for the delay in answering your letter of December 13th but for part of the time over the holidays I was up in Massachusetts.

I think you were misinformed about some of the things you mention. First, as far as I can remember, I never talked to Major Hart nor, also as far as I remember, I have never met him and would not know him if he walked in the door.

I saw Dr. Menzel at a dinner in December but other than saying "Good Evening - Merry Christmas" there was no conversation and I have never carried on any conversation with Menzel about NICAP or UFO. He did send me a copy of his book for which I thanked him but took no position on the statements he made.

Please take my apologies again for being so long in answering your letter and with best personal wishes to you, believe me, as ever

Sincerely,

R. H. Hillenkoetter

Apr

In spite of Dr. Menzel's unfounded attacks on NICAP, we could not believe he would deliberately make a false claim about Adm. Hillenkoetter. Since he was on a quiz program, arguing under some stress, we could only assume he had confused Hillenkoetter with some one else.

For this reason, we refrained from publishing the letter. But since Menzel is now repeating this claim, we have no choice.

During his five years on the Board, Adm. Hillenkoetter strongly supported all NICAP policies, including our views against unwarranted secrecy. When he left the Board, there was no ill feeling, as Dr. Menzel has implied. In a letter to the director, he said he felt we had reached a stalemate. He said he knew the UFOs were not secret U.S. or Soviet devices, and if they were extraterrestrial we could do nothing but wait for them to act.

Though we did not agree there was a stalemate, we did not argue the point. A majority of our Board, advisers and members are convinced a great deal can be done to prove UFO reality and help prepare the public for whatever develops. We believe the events of this past year have proved this policy correct.

Note to members: If you hear the above claim broadcast again, ately and quote Adm. Hillenkoetter's January 8th letter to get the facts on record.

We do not have space here for the admiral's signed statement cited in paragraph four, but if it becomes necessary we will print

Landing Probed by NICAP, AF

A curious landing report, in New York state on Aug. 19, has been thoroughly checked by NICAP, state police and a five-man AF team. This sighting, which occurred on the William Butcher dairy farm near Cherry Creek, N.Y., involved three members of the Butcher family and a fourth witness. Here is their report:

At 8:20 p.m., Harold Butcher, 16, was operating a milking machine in a dairy barn housing 17 cows. A portable radio on the wall was turned to a newscast, when a sudden static-like interference drowned it out. Then the tractor which ran the milking machine abruptly stopped. A moment later, a Holstein bull secured outside began to bellow and pull at a steel bar to which it was chained.

Young Butcher ran to a window and saw a large elliptical object nearing the ground, a fourth of a mile away. A reddish vapor could be seen underneath, and he heard a steady beep-beep sound. The UFO was on the ground only a few seconds, then it shot straight up, disappearing in low clouds.

When the other witnesses came out, after Harold Butcher phoned the house, they noted a strange odor, also a greenish glow in the clouds where the UFO had vanished. Meantime, it was found that the bull had bent the steel bar in his efforts to get loose.

Half an hour later, when the strange craft reappeared, circling the area, Mrs. Butcher called State police. Two troopers investigated, notified the AF. Next day, Capt. James Dorsey, Operations Officer, 4621st AF Group, arrived with four AF technicians. When they examined the ground, an odd purplish liquid substance was discovered at several places. Small unexplained marks, two inches wide and two inches apart, also were found, along with patches of singed grass and foliage.

After the AF team left, NICAP member Jeffrey Gow obtained samples of the purplish substance and singed foliage, and samples were studied by the Kawecki Chemical Co., whose president is a NICAP adviser. Spectrographic analysis showed the main elements of the liquid to be aluminum, iron and silicon. Some phosphorous was found in the weed samples, which the analyst said might cause a phosphine smell, explaining the odd odor.

On the night following the Cherry Creek incident, State Trooper Richard Ward, a few miles from this area, watched an object with eight circular lights in line flying twice as fast a a jet. It emitted a faint, unfamiliar purring sound.

Dr. Fred C. Fair and John Maxwell, of NICAP New York Subcommittee No. 2, carefully checked the Cherry Creek site and questioned the witnesses. On the basis of present evidence, they believe the report is genuine. Dr. Fair has confirmed that two state troopers who investigated also seem to be convinced.

We wish we could thank by name all the NICAP investigators, sub-committees and affiliates and other members who have worked so hard to investigate the many recent sightings. Without their aid, we would not have been able to check many important reports.

We regret we cannot personally thank all of you who have sent in newspaper clips on sightings. We appreciate this help very much, and it will be especially important now since we have had to cancel our clipping service. (During the recent months, we had expensive overcharges when hundreds of clips on the same sightings were sent to us by the clipping bureau.)

When you send in clippings, please give the name of the newspaper and date of publication, either in the margin or on a separate card or slip.

Because of the flood of recent sightings it took extra time to select and write up the details for this issue, causing a ten-day delay in going to press. We are starting on Vol. III/5 at once and will do our best to mail it well before Thanksgiving.

strong vertraulich

3 Kingswood Road
Weehawken, N. J.

October 13, 1970

Charles D. Willis, M. D.
3546 E. Shields Ave.
Fresno, Calif., 93726

Dear Doctor Willis:

Unfortunately, I cannot give you a categorical answer to your questions regarding a quote from the Evening Gazette of Worcester in 1960. To the best of my recollection, I never gave any interview to the Evening Gazette; in fact, until I received your letter, I never knew any such paper existed.

Half the quote mentioned is correct, however - that part stating that neither the U. S. and Allies, nor the Germans, nor the Russians, ever had anything approaching the alleged speeds and maneuvers of the alleged sightings. As regards the other half of the quote, I never stated that the unknown objects were operating under intelligent control. I did say that UFO's should be investigated to try to find out if they existed, and if so, where they came from.

Now, in 1970, I am of the belief that the UFO's are not of extra-terrestrial origin for the following reasons:

(a) For at least twenty-five years, there have been no completely authenticated sighting of such craft - nothing like, for example, seeing a 747 on a runway or in the air by numbers of people.

(b) In a negative sense, also, in twenty-five years, there has been no positive action by a so-called UFO, either friendly or hostile actions. Surely, if they exist, in all that time, one or more would have made contact, again, either friendly or hostile, with some part of the earth, or would have been forced down by mechanical or other failure. The lack of such actions makes me believe that UFO's from outside the earth have not as yet visited here.

I should be very interested to receive your book as to the nature of these phenomena, when the book appears.

I regret I cannot give you a more definite answer as to that newspaper clipping, but too much time has gone by.

Very truly yours,

R. H. Hillenkoetter
Vice Admiral, U.S.N. (Ret.)

Apr

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Alle Rechte vorbehalten
7 Stuttgart 30
Weinbergweg 57
West Germany

2476 Glenwood Avenue
Toledo, Ohio 43620
September 14, 1988

Mr. William Moore
4219 West Olive Street, Suite #247
Burbank, CA 91505

Dear Mr. Moore:

My husband is a subscriber to the Skeptical Inquirer. As a result, I have had occasion to follow Philip Klass's commentary on the "MJ-12" documents. I like to think that, in my own enchanting way, I am an open-minded person. Thus, I acquired a copy of the "MUFON Symposium Proceedings" to see what you folks might have to say in response.

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Be that as it may, I used to work and live in Europe. I prominently noticed, therefore, the question regarding the use of "0" before single-digit dates and whether it was a common practice before the advent of computers. Especially in European cursive, single digits can easily be mistaken for double digits. The worst offender is the numeral "7." The way Europeans write it, it can look very much like "17." Similarly, a "2" can look like a "12." Examples:

Seven or Seventeen?:   Two or Twelve?: 

Suppose, now, you are dealing with sensitive intelligence data. Suppose most of your operatives are filing hand-written reports. Suppose further that you are dealing with situations in which an error of ten days can literally mean someone's life. We quickly see that the question revolves around issues of clarity, not the logistics of computer technology.

Let us suppose a little further. In the interests of clarity, would you not

devise your intelligence system so it was impossible to write an unclear date? The best way to indicate that you intend a single, not a double, digit is to use two digits at all times and, should there be no first digit, to so indicate with an unmistakable symbol. It is very hard to make a zero look like anything but a zero, so why not use that symbol to signify that a single digit follows? Just to make doubly sure that no one can read your zero as the letter "O," why not slash through all zeroes? (Eg.: Ø). A slashed zero simply cannot be mistaken for anything but a slashed zero. Finally, to make triply sure, would you not require the use of the clarifying zero at all times rather than allow it be be optional?

This is exactly the European method -- at least it was in the sixties. I believe if you check, you will see it is a NATO practice, as well. If you check still further (there must be an FOI-obtainable procedural manual around somewhere), I think you may find this is a standard, common sense procedure for all hand-written U.S. intelligence records. It predated computers because it had nothing to do with computers. It had to do with guarding against the sort of ambiguity found in hand-written numerals.

Regarding Executive Orders, do some research on their legal function and purpose. I believe you will find that, far from the informal, memorandum-style communications Mr. Klass suggests they are with his proto-Truman prose, Executive Orders are intensely formal documents which, over the signature of the President of the United States, carry the force of federal law. To challenge them, I believe one must go to federal court on constitutional grounds. It is my understanding that Presidents use Executive Orders to circumvent Congress when:

(1) An issue is too hot politically to approach legislatively (for example, the Executive Order creating regional Councils of Government [Presidential Order 12372, 1966, I think] for intergovernmental review of federal programs); or,

(2) An issue is too sensitive for public debate (for example, the exchange of arms to Iran in return for the release of western hostages in Beirut).

I was struck myself by Mr. Klass's anomalous rendering of Executive Orders when I first read his piece in the Skeptical Inquirer and bemused by his assertion that Mr. Truman would have created a federal fiat containing colloquialisms and profanity.

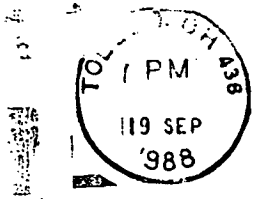
Finally, I am a little surprised that you have not seemed to notice the disinformative nature of what you claim Mr. Klass is doing. If Mr. Klass is, indeed, deliberately spreading disinformation in a way similar to that Mr. Menzel allegedly once did, perhaps you should inquire a little more perceptively into the background, funding sources, and connections of this Washington-based commentator.

These are just my inexpert observations -- I am no authority either in federal law or intelligence operations.

Sincerely,

R. Mann

Ms. Barbara Mann
2476 Glenwood Avenue
Toledo, Ohio 43620



Mr. William Moore

4219 West Olive Street, Suite #247

Burbank, CA 91505

[redacted]

3 Kingswood Road
Weehawken, N. J.

14 December, 1970

Note

Mr. Wolfgang Nagel
Weinbergweg 57
7 Stuttgart 80 (Valhingen)
West Germany

Dear Mr. Nagel:

In reply to the questions in your letter of 8 December, I never stated that the unknown objects were operating under intelligent control. I did say that UFO's should be investigated to try to find out if they existed, and if so where they came from.

As far as I know, UFO's are not of extra-terrestrial origin for the following reasons:

(a) For at least 25 years, there have been no - completely authenticated sighting of such craft - nothing like, for example, seeing a 747 on a runway or in the air, by numbers of people.

(b) In a negative sense, also, in 25 years there has been no definite positive action by a UFO either of friendly or hostile nature. Surely, if they exist, in all that time one or more would have made contact, again either friendly or hostile, with some part of the earth. The lack of such actions makes me believe that UFO's from outside the earth have not as yet visited here.

Neither the U.S. Air Force nor the Pentagon has issued any orders suppressing the truth about UFO's.

I have never heard of anyone who was in possession of UFO fragments and as far as I know no such UFO fragments exist.

The conclusions as to the extra-terrestrial origin of UFO's are, in my belief, insufficient and unproven.

I know of no prominent scientist or officer advocating the extra-terrestrial origin of the UFO's in public.

For your information I am enclosing a copy of a letter received from Dr. Willis in California and my reply thereto. You may like to get in touch with him.

Very truly yours,

R. H. Hillenkoetter
Vice Admiral, U.S.N. (Ret.)

Apr

DATE FORMATS WITH LETTERS SURVEY '78-'82

to J. Ward 7 August, 1978 ✓

" 4/30/86 ✓

" ~~6th June, 1984~~

" 14 Aug. '79 ✓

7 May, 1979 ✓

Pub. Prop. Almost A.F. Pale. Lincoln

5th October, 1981 ✓

to Russell Arben 11th January, 1982 ✓

" W.J. Brooks 24 August, '81 ✓

John Griffin 7 May, 1980 ✓

FOIA to Nat. Archives, Natl. Rec. Ctr, Suitland.	October 13, 1983	✓
4	July 7, 1983	✓
UIAA	6 May, 1983	✓

To Mosley.

~~25 April, 1984~~

27th April, 1984 ✓

To Klass 8 October, 1982 ✓

5 October, 1982 ✓

8 July, 1983 ✓

9 October, 1983 ✓

04 November, 1983 ✓

03 January, 1984 ✓

06 April, 1984 ✓

H. Taylor 05 July 1984 ✓

Z. Hansen 01 July, 1984 ✓

FOIAs

Archives July 7, 1983 ✓

CIA reply to FOIA 09 Aug 1982

Archives 10 September 1979 ✓

U.S.D.A. 5 May 1982 ✓

NSA to R. Todd - (copy) 01 May 1975

FOIA to NPRC 9th November, 1981 ✓

to USAF Intel. November 19, 1981 ✓

to CIA November 12th, 1981 ✓

reply from CIA 03 Dec 1981

to USAF March 5, 1982 ✓

" November 10th, 1981 ✓

to DOE 5 May, 1982 ✓

Asst. Sec. of Ag. 5 May, 1983 ✓

" " 7 March, 1984 ✓

CIA 6 March 1984 ✓

USAF 7 July, 1983 ✓

~~Nat'l Archives (Check Re: Carter [illegible])~~

Amsterdam	01 November, 1983 ✓
"	01 March, 1984 ✓
	05 July 1984 no space ✓
Malta	23 MAR 87
	02-20-87 ✓
	5 JANUARY 1983 ✓
letter from MALTA	30 September, 1982 8 October, 1982
to Malta	5 October, 1982 ✓
	2 September, 1982 ✓

G. Hamilton 31 Oct. 88
11/25/88

G. Hathaway 06 Aug. '88

Granchi 16 FEB 87

FOIA Dept of St. 3 August 1982 no sep. /

reply "08 SEP 1982"

Ickoff 1 May, 1981 ✓

N. Gilchrist 2/6/85

R. Carlisle 3 January 1987 ✓ no FP.

Lebedeva 5-20-86 ✓

I. Brown 21 Feb. '86 ✓ no space.

Foot IRE 12 Sept. 1986 ✓

" 28 November '84 ✓ no comma.

Gross Iowa 11/10/86 ✓

Verity 10/2/86 ✓

" 10 FEB 87 ✓

~~4/10/86~~ ✓

~~Hamilton (Lloyd)~~

Sherwood 4/02/86 ✓

TO: Klass

10/16/86

25 Feb. '86 ✓

Telegram from Klass 03/04/84

16 March 1987

10/21/86

11/11/86

To Clark 06 June, 1985 ✓

TO Klass 26 Dec. '85 ✓

07 Jun, 1985 ✓

COPY [redacted] COPY

John Gingrich, Director, Division of Security,
USAEC, Washington 2 February, 1949
(THRU: B. O. Wells, Director, Security Division, SPOO, Los Alamos)
Sidney, Newberger, Jr., Chief, Security Operations Branch,
SPOO, Los Alamos
AERIAL PHENOMENA

REFER TO
SYMBOL: SFD-3-1

Attention: C. A. Rolander, Jr.

At a meeting of representatives of various intelligence agencies in this area on January 10 in Albuquerque, New Mexico, one item of prime importance which was discussed was the matter of the recurring aerial phenomena observed in this area.

Present at this meeting was Capt. H. E. Neef, USAF, of the 17th District OSI, Kirtland Field, who has been devoting considerable time to the subject, pursuant to orders from his higher headquarters, USAF. Capt. Neef stated that it would be of great value to him locally and also to his higher headquarters if he could discuss the information they have already obtained with some of our top scientists in order to obtain their opinions, at the same time bringing to their attention that the USAF considers this matter of vital importance from an intelligence angle and a national defense matter.

Upon return from the meeting a written report was submitted to the Manager, SPOO, setting forth in general the above information and recommending to him that we proceed to arrange a meeting between our top scientific personnel, selected by E. E. Bradbury; Capt. Neef; and Major W. A. Godsoe, Officer in Charge, Military Intelligence District, New Mexico, Fourth Army, at a date mutually agreed upon by Dr. Bradbury and parties concerned. Mr. Tyler concurred in this and Dr. Bradbury is willing to undertake the selection of the scientists. The date has now been tentatively set as the afternoon of February 18 beginning at 1300 hours at which will be present scientists of Bradbury's selection, the writer, and whoever is designated by the Manager, SPOO, with Mr. Typer included if he so desires.

Since our original plan, we have indications that Col. E. L. Poland, G-2, Fourth Army, would be desirous of attending such a meeting, as well as Dr. Lincoln La Paz, University of New Mexico Department of Meteorities. Dr. La Paz, has in the past been of valuable assistance not only to this organization but also to the Air Force on similar subjects.

COPY COPY

[redacted]

JAN 31 1951

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Annual Report - January, 1951

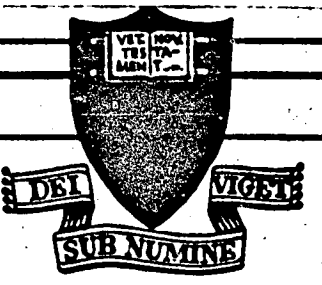
Contract NOrd - 7920 Task PRN-3

Department of Chemistry

Princeton University

Princeton, N. J.

(Transmitted by Robert N. Pease)



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Annual Report - January, 1951

Contract NOrd - 7920 Task PRN-3

Department of Chemistry

Princeton University

Princeton, N. J.

(Transmitted by Robert N. Pease)

Under Joint Sponsorship of:

Project Bumblebee, Applied Physics Laboratory,

Johns Hopkins University.

Bureau of Ordnance, Navy Dept.

Contract NOrd-7920. Task PRN-3

and

Project Squid, Princeton University.

Office of Naval Research and Office of Air Research

Contract N6-ori-105, Task Order III, Phase 2.

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This Task was formally assigned to Princeton University as an Associated Contractor of the Applied Physics Laboratory, Johns Hopkins University, by letter dated June 19, 1945, from A.F. Hussey, Jr., Rear Admiral U.S.N. Chief of Bureau of Ordnance; E.N. Parker, Captain, U.S.N., by direction, in the following terms-

"Research and development work is to be carried on in connection with rocket launched, jet-propelled, guided, anti-aircraft missiles related to Task F (Bumblebee) assigned to the Applied Physics Laboratory, The Johns Hopkins University, by the Bureau of Ordinance, with special emphasis on combustion of fuels and fundamental research of chemical principles governing the operation of such devices. This work shall include experimentation and testing of such fuels and principles, and design and fabrication of supplementary equipment used in carrying out this work. It shall also include cooperation through consultation and otherwise, as may be practicable, with other agencies concerned with the development or use of devices and techniques related to this Task PRN-3."

The above has been supplemented by Problem Statement PRN-3-A as follows-

PRN-3-A - Combustion Principles.

By the assignment of this problem under the scope of Task PRN-3 of Contract NOrd-7920, Princeton University is directed to do the following work in accordance with the provisions of said contract:

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A. Flame Propagation.

Make experimental and theoretical studies of flame speeds for laminar flow to a bunsen cone as a function of composition, pressure, temperature, flow velocity, tube diameter, and Reynolds' number; study the relation to calculated equilibrium atom and radical concentrations; make use of spectroscopic, photographic and sampling techniques; study the transition from laminar to turbulent flow, especially at low pressures.

B. Reaction Kinetics.

Make experimental and theoretical studies of the kinetics of oxidation reactions, including the oxidation of diborane, hydrazine, and related substances; study the spontaneous ignition of fuels using addition agents.

Beginning April 1, 1947, the expenses of this project have been divided equally between Contract NOrd-7920, Task PRN-3, and Contract N6-ori-105, Task III, Phase 2. (Letters: Office of Naval Research 17 January, 1947, File EXOS:ONR:251, Serial No. 9707; and Bureau of Ordnance 14 February, 1947, File: NOrd-7920, Re9d-AKC/gep). From January 1, 1949 to December 31, 1949, the amount charged to Contract NOrd-7920 Task PRN-3, was $16,330.82.

Authorization to treat the subject matter as unclassified has also been received (Letter: Bureau of Ordnance, 21 April, 1947, File NOrd-7920-Re9d-AKC/gep).

Since January 1950, the following Technical Papers have been submitted-

No. 48. The Effect of Traces of Oxygen on the Reaction of Aluminum Borohydride with Ethylene.
by Richard S. Brokaw

No. 49. The Kinetics of the Thermal Decomposition of Diborane, with a Review of Structure Data.
by Richard P. Clarke.

The following articles based on project research have been published-

Kinetics of the Non-catalytic Oxidation of Ammonia: Flow Experiments.
by Edgar R. Stephens and Robert N. Pease
(J.Am.Chem.Soc. 72, 1188 (1950))

The Low Temperature, Low Pressure, Hydrogen Atom Initiated Combustion of Hydrocarbons.
by Elmer J. Badin
(J.Am.Chem.Soc. 72, 1550 (1950))

The Oxidation of Butene-1 Induced by Aluminum Borohydride.
by Richard S. Brokaw, Elmer J. Badin and Robert N. Pease (J.Am.Chem.Soc. 72, 1793 (1950))

The Kinetics of the Reaction of Aluminum Borohydride Vapor with Olefins.
by Richard S. Brokaw and Robert N. Pease
(J.Am.Chem.Soc. 72, 3237 (1950))

The Effect of Traces of Oxygen on the Reaction of Aluminum Borohydride with Ethylene.
by Richard S. Brokaw and Robert N. Pease
(J.Am.Chem.Soc. 72, 5263 (1950))

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Princeton University
Department of Chemistry
Combustion Project
January 1, 1951

Flame Speeds. With a view to obtaining a self-consistent set of data on flame speeds in order to test the hydrogen atom diffusion theory, measurements by the Bunsen burner method are being made with methane-containing mixtures. Methane has been selected because it apparently avoids complications due to low-pressure thermal ignition limits, and cool flames. Inner flame-cone areas in a jacketed burner are projected on to a photographic film by means of a point light source (shadow method). To date a set of measurements at 1 atm. and 23°C have been obtained for mixtures of methane and dry air. At 9.5 vol. % methane (stoich.), the linear velocity is found to be 40.5 cm/sec. The maximum in the curve lies at about 10.5% and 43.2 cm/sec. Data are being obtained on mixtures containing argon and helium (in place of nitrogen) and will be extended to lower pressures.

Thermal Ignition Limits of Diborane-Oxygen Mixtures. Dry mixtures of diborane (B_2H_6) and oxygen do not react spontaneously at room temperature and moderate pressure in glass vessels. At 165°C explosions occur over a rather broad range of compositions (e.g. mixtures containing 5mms O_2 - 50 mm B_2H_6, and 50 mms O_2 - 5 mms B_2H_6). At lower temperatures the limits narrow, in the sense that for a given diborane pressure these are upper and lower limits of oxygen pressure. Thus at 120° and 15 mms B_2H_6, explosions are observed only between about 5 and 15 mms O_2 with induction periods of various lengths. It appears that decomposition of diborane is a necessary preliminary to oxidation since the temperature range is that in which decomposition rates are appreciable. There is also an indication that added hydrogen inhibits the explosion, as might be expected from its inhibitory effect on the quasi-reversible decomposition reaction. It is planned to extend these observations and to study the interactions with ethylene present.

Non-Catalytic Oxidation of Ammonia. It has already been shown by means of flow experiments at 1 atm. that ammonia and oxygen react slowly at about 600°C giving nitrogen and water. In particular, it was found that the absolute rate increased rapidly as the percentage of ammonia was decreased. Static (constant-volume) experiments have now been run in which the partial pressures of ammonia and oxygen could be independently varied. In a clean (nitric acid-water) silica bulb it is found that at 625°C and 400 mm total pressure the half-reaction time is about 70 sec. for a 1 NH_3:3 O_2 mixture, and 4900 sec. for a 3 NH_3:1 O_2 mixture -- a ratio of 70:1. Variation with individual partial pressures is indicated in the following table (625°C.)

NH_3 Press. mms.	O_2	t_{50} secs.
100	300	70
100	200	150
100	100	1300
200	100	10000
300	100	4900

At constant initial composition the half-reaction time varies inversely as the initial pressure, indicating an over-all second order but the significance of these results is not yet clear. Final pressure increases are about 80% of calculated for nitrogen and water as products, which indicates an intermediate. Nitrous oxide (N_2O) is a possibility. Perhaps nitric oxide is first formed followed by nitric acid, ammonium nitrate and nitrous oxide. Only traces of nitric oxide (or nitrogen peroxide) were ever detected -- a fact which is not surprising in view of the observation that ammonia and nitrogen peroxide react rapidly at room temperature. Experiments with a salt-coated bulb (decreased rate) are in progress

The Reaction between Hydrazine and Oxygen. As a further contribution to the study of H:N:O systems, the oxidation of hydrazine (N_2H_4) is being investigated. As yet only preliminary data are available, but these give some interesting indications. For example, when oxygen atoms from a discharge tube are mixed with hydrazine vapor at about 1 mm. pressure and room temperature, ammonia is formed in about mole-for-mole amount compared to the hydrazine reacted (unless the oxygen is in some excess). The balance appears largely as nitrogen and water. Ammonia is also a product of the slow thermal reaction with molecular oxygen at about 100°C. Moreover, this process is still occurring with measurable rate at room temperature, where there is some indication that a surface reaction is involved. It remains to be determined whether the ammonia first formed -- or added ammonia -- is sensitised by the hydrazine. It is also of considerable interest to determine whether the reverse process -- the formation of hydrazine from ammonia can be brought about by an appropriate oxidation process.

Photochemical Explosion of Hydrogen-Chlorine Mixtures. Radiation from a # 22 G.E. flash bulb (rated at 62000 lumen-seconds) has been used to explode hydrogen-chlorine mixtures. Excessive difficulty in obtaining reproducible results has led to the termination of the problem, but some semi-quantitative conclusions may be given. Occurrence of explosion could be judged by the abrupt movement of the pressure indicator, and by analysis for unreacted hydrogen (condensation of hydrogen chloride and chlorine). The radiation passed through two (6 cm) lenses and reached the reaction flask as a parallel beam which illuminated 80% of its projected area. The distance from the flash bulb to the first lens was taken as a measure of intensity. With 45 mm. each of hydrogen and chlorine, explosion occurred at a distance of about 110 cm. between flash bulb and the first lens and led to over 90% reaction. However at somewhat greater distances the non explosive reaction accounted for as much as 40% reaction. Thus it may be inferred that explosion -- when it occurred -- was the result of self-heating since the heat release from 40% reaction would be sufficient to heat the mixture far above its thermal explosion limit (~ 500°C).

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Contract NOrd-7[illegible]

Task PRK-3

DEPARTMENT OF CHEMISTRY
PRINCETON UNIVERSITY

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SEMI-ANNUAL REPORT - JULY, 1947

Contract NOrd-7920, Task PRN-3

Department of Chemistry,

Princeton University

Princeton, N.J.

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This Task was formally assigned to Princeton University as an Associated Contractor of the Applied Physics Laboratory, Johns Hopkins University, by letter dated June 19, 1945, from A. F. Hussey, Jr., Rear Admiral U.S.N. Chief of Bureau of Ordnance; E. N. Parker, Captain, U.S. N., by direction, in the following terms-

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Authorization to treat the subject matter as unclassified has also been received (Letter: Bureau of Ordnance, 21 April, 1947, File NOrd-7920-Re9d-AKC/gep).

SUMMARY OF TECHNICAL PAPERS

Experimental work undertaken in the past six months is partially summarized in six Technical Papers, copies of which are appended.

Two of these papers (nos. 26 and 30) deal with methods of flame detection and flame speed measurement in glass tubes without the use of internal probes or electrodes which might interfere with the flame itself. In one application the loading characteristics of a high-frequency oscillator tank coil are altered as the flame passes - due presumably to increased eddy current losses in the ionized gas. In the other case, two narrow aluminum bands around the explosion tube are connected through a high resistance to a source of e.m.f. Passage of the flame alters the resistance of the circuit producing a voltage pulse which triggers an electronic timing circuit.

The broadening of low-pressure ignition limits of n-butane in air or oxygen as temperature is raised reveals some interesting results (Paper No. 28). With oxygen the only effect is to halve the lean limit between 25° and 300° C. The low-pressure limit remains fixed at about 25 mm. (Spark ignition is one inch glass tube; downward propagation). With air, on the other hand, the lean limit is only moderately reduced, but the lower pressure limit falls from about 100 to 50 mms.

In the field of spontaneously ignitable compounds, it is

found that boron tri-ethyl ignites in oxygen at pressures of the order of 1 mm. without a measureable induction period. (Paper No. 27) There is an inverse relationship between pressure and vessel diameter. A spray of boron tri-ethyl directed at a stream of oxygen from a tank also ignites. Further, introduction of a butane-oxygen mixture to a bulb containing a few mms. pressure of boron tri-ethyl leads to explosion. All of the above refers to room temperature.

Experiments on the interaction of atomic hydrogen (from Wood's discharge tube) with molecular oxygen at low pressures have led to interesting results (Paper No. 31). If the product is condensed at liquid nitrogen temperature (77° K.) a considerable amount of hydrogen peroxide is recovered. However, condensation at solid carbon dioxide temperature (194° K.) gives no peroxide and very little water. It seems fairly evident that the reaction is occurring mainly on the walls of the cold trap - perhaps by adsorption of hydrogen atoms on a liquid oxygen layer.

A significant outgrowth from the work of this project has been a theory of the bunsen-type flame, due largely to the work of a graduate student, Mr. C. Tanford, who has been a National Research Council Pre-doctoral Fellow for the past year. It is assumed that flame propagation depends on the back-diffusion into unburnt gas of atoms and radicals from the flame front. These atoms and radicals are assumed to be at thermodynamic equilibrium concentrations at the calculated flame temperature. Simultaneous calculations of concentrations and temperature are made by successive approximations. The atom and radical concentrations are then compared with the observed burning velocities. Assuming there is no net loss of atoms and radicals during reaction, it turns out that as a first approximation one may write -

$$V = \left(\frac{k\ C_{ave.}\ c_o\ D}{Q}\right)^{1/2}$$

where

V = the linear burning velocity in cms. per sec.;

k = a velocity constant;

$C_{ave.}$ = average concentration of reactant;

C_o = atom or radical concentration at equilibrium in the flame front;

Q = concentration of combustible;

D = coefficient of diffusion.

Thus, if $C_{ave.}$ and Q may be approximately equated -

$$V = k' c_o^{1/2}$$

where k' is a constant characteristic of the reaction. The vel-

ocity, v, should then vary roughly as the square-root of the atom and radical concentration in the flame front. This relation is found to apply. Further, since c_o should decrease roughly as the square-root of the pressure whereas D should increase linearly as pressure is decreased, the burning velocity should first increase as pressure is decreased (roughly as the fourth-root). This is also found, though at lower pressures the velocity passes through a maximum.

In connection with the above, burning velocities of butadiene with "air" in which the nitrogen is replaced by helium have been compared with ordinary air (Paper No. 29). The difference (nearly 4 to 1) is due mainly to the fact that atom concentrations in the flame front are greatly increased. This in turn follows from the fact that the lower heat capacity of helium leads to a higher temperature (about 300° C.) and hence more dissociation. In addition, the diffusion coefficients in helium air are increased.

It would thus appear that at least a start had been made in accounting for some of the special properties of flames.

CURRENT PROBLEMS

Activities being carried on at the present time include the following: -

1. Low-pressure flames using a Bunsen-type burner of relatively large orifice;
2. Kinetics of oxidation of hydrazine, diborane, and aluminum borohydride
3. Spectroscopic verification of NO, NH, and CN radicals in Bunsen-type flames;
4. Evaluation of leak-detector type mass spectograph;
5. Calculation relating to flame speeds.

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(Signed) Robert N. Pease

Robert N. Pease
Professor of Chemistry
Princeton University

UNANNOUNCED

THE HIGH FREQUENCY OSCILLATOR AS A FLAME DETECTOR

By

Hartwell F. Calcote

(Transmitted by Robert N. Pease)

Department of Chemistry, Princeton University

Contract NOrd-7920, Task PRN-3

Technical Paper No. 26

March 25, 1947

SUMMARY

A new method of detecting ionization in flames utilizing the loading characteristics of a high frequency oscillator is described for use in the measurement of flame speeds. As the flame passes through an oscillator tank coil which is constructed around a combustion tube, the absorption of energy due to ion formation and increased eddy-current losses in the gas causes an increase in the plate current of the oscillator which is used to trigger an electronic chronoscope. Two distinct advantages of the method are: (1) direct measurement of flame speeds can be made without the introduction of electrodes or screen wires into the tube, and (2) the point in the tube at which the measurement is made can be varied at will.

INTRODUCTION

Various methods of detection have been described for use in the measurement of flame speeds in addition to the photographic method of Mallard and Le Chatelier[1]. These have been necessary in some cases where the luminosity of the flame is extremely low, and in others as a matter of convenience to avoid the development of film. All of them, however, have the disadvantage that something must be placed inside the tube which may distort the flow of flame gases and thus enhance the flame surface area. This is undesirable since the surface area plays a large part in determining flame speeds[2]. In the case of very weak flames, metal probes may actually extinguish the flame by cooling.

In both the spark method[1][3] and in the flame conductivity method[4][5] it is necessary to have electrodes in the tube. In the method of melting screen wires[6] it is not only necessary to have a thin wire stretched across the inside of the tube but it is also necessary that after each measurement the screen wires be replaced.

The method described below, which takes advantage of the fact that an increase in ionization within a coil will absorb energy from, or lower the Q*, of the coil, does not have any of these disadvantages. The coil can be wound around the glass tube through which the flame is propagated, and the additional advantage is obtained that the coil can be simply moved from one point on the tube to another so that measurements are not confined to one region of the tube. Of course in the measurement of flame speeds two such oscillators are used to trigger a chronoscope "on" and then "off".

Similar applications of loading tank coils to detect ionization have recently been made in the field of electrolytic solutions. Bradhurst[8] used a Hartley oscillator with the tank coil wound around a sector of glass tube in a "decant" line. Oscillations were obtained when oil passed through the

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* The Q or "quality factor" of a coil or circuit is defined as the ratio of the energy stored to that dissipated in each cycle of the oscillation[7]. Since the energy stored is proportional to the reactance and the energy dissipated is proportional to the resistance: Q=X/R, where X is the reactance of the circuit, and R is the equivalent resistance.

coil but stopped when a conducting acid entered. Jensen and Parrack[9] used a tuned plate-tuned grid oscillator with the tank coil of the oscillator wound around a titrating flask. Conductomeric titrations were run using the change in plate current due to loading as a measure of the change in conductivity of the solution.

CIRCUIT CONSIDERATIONS

Since this application of an oscillator depends on the loading of the circuit, i.e. on an increase in the dissipation of energy in the tank coil, it is important that (1) the normal circuit losses be negligible and (2) that the circuit be sensitive to any change in the Q of the tank coil. Both requirements demand a high Q circuit. In addition the second requirement suggests that the inductance, L, in the tank circuit should be large compared to the capacity, C.

High frequencies are necessary because eddy-current losses are proportional to the square of the frequency. Assuming the same type of argument for eddy-current losses in a conducting flame as in an iron core transformer[10], the power loss is $P_e = KB_m^2 f^2/R$ where, K is a constant containing the dimensions of the volume in which the losses occur, B_m is the maximum value of the flux density, f is the frequency, and R is the resistance of the flame. However as the frequency is increased, the effective Q of the coil is decreased due to the skin effect so that it is necessary to obtain a balance between the two effects.

The above considerations might be fulfilled by almost any type of oscillator having one or more tuned circuits. However in addition to changing the efficiency of oscillation, examination of the complete equation for the frequency of an LCR circuit:

$$f_{osc} = \frac{1}{2\pi}\sqrt{\frac{1}{LC} - \frac{R^2}{4L^2}}$$

or for a tuned plate oscillator:[11]

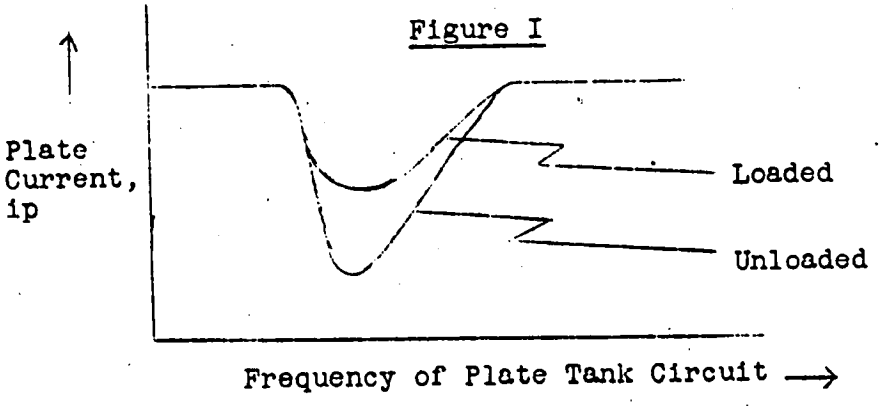
$$f_{osc} = \frac{1}{2\pi\sqrt{LC}}\sqrt{\frac{R + R_p}{R_p}}$$

shows that the frequency is also dependent upon the resistance in the circuit. R_p is the tube resistance and the other symbols

have their usual meaning. These equations although applying only to the special cases where the resistance is in series show that some advantage might also be taken of the change in frequency due to a change in the effective resistance of the coil. This can be done by using an oscillator with more than one tuned circuit, such as a tuned plate-tuned grid oscillator.

Figure I for a tuned plate-tuned grid oscillator shows that any change of loading or frequency variation in the plate tank circuit will produce a change in plate current.

Figure I



DESCRIPTION OF OSCILLATOR

The particular oscillator used was a tuned plate-tuned grid oscillator, with the plate tank coil consisting of three turns of bare No. 12 copper wire wound close-spaced around the combustion tube (28 mm. pyrex). In order to obtain the maximum L/C ratio no additional capacity was placed in parallel with this coil, the stray capacity and plate to cathode capacity of the tube being utilized. When a 6J5 triode was used, this gave a resonant frequency of approximately 65 megacycles; and with a 955 acorn tube the resonant frequency was 100 megacycles. The frequencies were measured by the Lecher wire method.

The coil was mounted directly to the circuit to avoid any unnecessary losses in the lead from the coil to the oscillator. The circuit (Figure 2) was constructed on a piece of Lucite 8 x 11 cm. and a steel rod connected perpendicular to the

plane of the Lucite. The rod was then mounted by means of a regular clamp holder to a long steel rod running parallel to the Pyrex combustion tube. This arrangement permitted the measurement of flame speeds over any section of the combustion tube by merely moving the coil and oscillator along the tube.

Tuning of the oscillator was achieved by placing a vacuum tube voltmeter across R_1 and tuning C_1 for a maximum voltage i.e. a minimum current. C_2, which controls the feedback, is then adjusted until the circuit goes out of oscillation easily when either C_1 is varied or when one holds his hand in the vicinity of L_2.

The circuit values are not critical although maximum sensitivity will be obtained when R_1 is as large as feasible. In order to obtain a high Q for the overall circuit, C_1 should be large compared to L_1, and R_2 should be large[7]. The value of R_2 is usually limited by the fact that when it becomes excessively large the time constant of R_2C_2 will cause the grid bias to build up until the tube blocks i.e. is "cut-off". The circuit then ceases to oscillate until the condenser C_2 has discharged sufficiently to permit the tube to again conduct and oscillations to take place. The cycle is then repeated giving bursts of oscillations, a phenomena which is commonly called motorboating. In most oscillators this cannot be tolerated. However in this application motorboating at a frequency sufficiently high so that it does not pass appreciably by the choke coil, to give a trigger pulse to the chronoscope, is not objectional. In fact it has been found to increase the sensitivity considerably.

With a B^+ voltage supply of 400 volts the D.C. voltage at the point "output pulse" is 35 volts and a voltage pulse of approximately 4 volts is obtained. When motorboating is allowed the D.C. voltage is 80 volts and the pulse voltage is approximately 15 volts.

The flame speed was measured in a stoichiometric n-butane + air mixture at 200 mm. Hg. pressure. Other pressures and compositions gave equally satisfactory results.

SUGGESTED APPLICATION

It is suggested that in addition to the use described herein this type of flame detector might be used in industry as a combustion protection control i.e. as a safety measure

to indicate when a flame goes out. At present the indicators used include such things as:[12] (1) flame conductivity measurements, (2) photocells, and (3) the utilization of the flame rectification principle. The high frequency oscillator detector should prove a much simpler and cheaper piece of equipment than those already in use.

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LEGEND TO FIGURE 2

T - 955 Acorn tube

C_1, C_2 - 25 mmf. tuning condensers, Cardwell ZR-25-AS

C_3, C_4 - 500 mmf. midget mica condensers

L_1 - Three turns No. 12 copper wire, 1/2 inch in diameter and 3/4 inches long.

L_2 - Three turns No. 12 copper wire wound close spaced around the reaction tube.

L_3 - 2.5 mh. R. F. choke

R_1 - 1 megohm resistance

R_2 - 0.5 megohm resistance

The filament and plate voltages were obtained from an electronically regulated power supply.

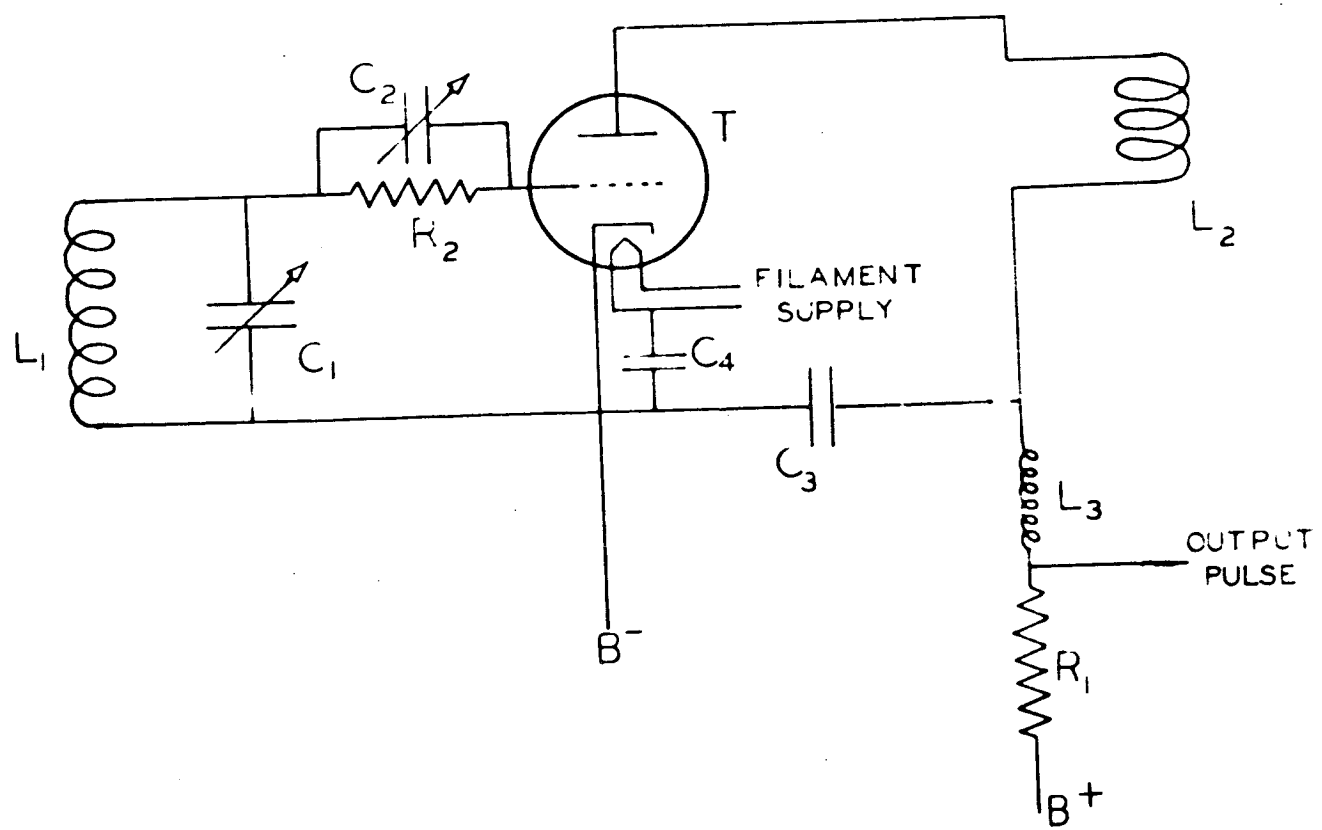

FIG. 2 OSCILLATOR CIRCUIT

EFFECT OF VESSEL SIZE AND SURFACE COATING ON THE COMBUSTION OF BORON TRIETHYL

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SUMMARY

The effects of the diameter of the explosion vessel and of surface coatings on the spontaneous combustion of boron triethyl and oxygen has been studied. In general, decreasing the bulb diameter raises the explosion limit; bulbs self-coated with reaction products raise the limit. Good agreement with collision theory for variation of total pressure and diameter of reaction bulb has been obtained. In addition the effect on the explosion limit of various other surfaces has been determined.

INTRODUCTION

Studies of the spontaneous combustion of zinc dimethyl-oxygen, nickel carbonyl-oxygen and aluminum borohydride-oxygen have previously been reported[1]. All such combustions have been carried out in spherical pyrex bulbs and have been characterized by formation of solid reaction products. Formation of solid reaction products or "mists" suspended in the gaseous mixture would undoubtedly be expected to have an effect on the combustion characteristics. As a first step in evaluating the effect of surface coatings and vessel size, the combustion of boron triethyl has been studied under various conditions. The effects of flask size and various surface treatments on the combustion limits of boron triethyl-oxygen mixtures at 0°C. are reported here.

APPARATUS AND METHOD

The apparatus used is shown in Figure I. The $B(C_2H_5)_3$ was contained in bulb A. Bulbs B and B' were used for gas storage, the gases being admitted through stopcocks C and C'. Air from the room was admitted through a charcoal-calcium chloride dryer D. Reaction bulbs, E, were spherical flasks of volumes close to 50, 150, 200, 500 and 1000 cc. corresponding to calculated inside diameters of 4.6, 6.6, 7.4, 9.8 and 12.7 cm. respectively and were fitted with 10-30 ST joints. Oxygen was stored before reaction in the reservoir X. Both the reaction bulb E and the storage reservoir X were thermostatted. The connecting tubing between them was 6 mm. diameter, to permit rapid introduction and mixing of reacting gases. Pressures were measured on a direct reading manometer M and with a McLeod gauge F, designed to read pressures over a range of 0.0-15.0 mm.

Reaction bulbs were cleaned by treatment with boiling concentrated nitric acid followed by six rinses with distilled water. Drying was carried out over-night in an oven at 135°C., followed by blowing the flasks with dried air. Coatings were applied after this standard cleaning procedure, but coated bulbs were dried before use.

Bulbs were attached to the apparatus and evacuated to a pressure of about 10^{-4} mm., and $B(C_2H_5)_3$ vapor admitted to the reaction bulb to the desired pressure. The reaction bulb was then closed off by its stopcock. Oxygen was admitted to the reservoir X in an amount sufficient to give the desired final pressure when the connecting stopcock was

opened and the gases allowed to mix. Experiments were carried out in a darkened room in order to make observation of faint flashes. Flashes occurred immediately on opening the stopcock, without measurable induction period.

Since all the limits observed were below 11 mm. total pressure, accurate measurements of the pressure of $B(C_2H_5)_3$ (always less than 0.6 mm. at the limit) were necessary. While it is realized that the accuracy of McLeod gauge readings are subject to gas law deviations, particularly great with gases below their critical temperatures, it was felt that at the low pressures studied these deviations were of lesser significance. Also, the McLeod gauge permitted readings to less than $\pm$ 0.01 mm. in the pressure range of 0.00-1.00 mm., yielding pressure readings which were precise relative to one another, if not on an absolute basis. It was felt that the greater precision obtained using this system of metering was justifiable.

In the combustion experiments reported here the manner of addition of the reactant was of importance. In each case the oxygen was admitted rapidly to the boron triethyl vapor. It was noticed that if the addition of oxygen was slow, a slow burning or sustained "diffusion flame" resulted. This was true especially at pressures considerably above ($\sim$ 150 mm.) the explosion limits and at high concentrations of $B(C_2H_5)_3$ ($\sim$ 0.20 mole fraction).

Boron triethyl was prepared from the Grignard reagent and boron trichloride-etherate. It was purified by several distillations. As a final purification step 125 g. was fractionated in a helium atmosphere through a 20 plate column. A middle fraction of 20 g. (b. p. 95.0°C.) was used for all experiments.

RESULTS AND DISCUSSION

In a previous study of the combustion of zinc dimethyl[1] it was observed that below the explosion limit a slow and measurable oxidation of the metal alkyl occurred. An increase in pressure led to an increase in the rate of the slow oxidation finally going over into explosion. No such slow oxidation has been observed in terms of pressure-change or appearance of a mist with boron triethyl below the limit for periods as long as 1000 seconds. It appeared that reaction occurred instantaneously or not at all, that is, there was no evidence of a measurable induction period.

Initially a considerable amount of work was carried out at the reactant temperature of 25°C. In order to magnify any changes produced on the limits by varying the scale of operations the temperature was lowered to 0°C. In Table I data are given for the explosion limits of a 5% (0.05 mole fraction) mixture of boron triethyl in oxygen at 0° initial reactant temperature with varying bulb sizes and using clean "dry" pyrex surfaces and surfaces self-coated with reaction products. In the latter case the limit was approached from above; that is, successive runs were made in the same bulb with decreasing total pressure until the limit was reached. In this way some degree of uniformity in the coating produced was achieved.

In Table I the product pd (where p = total pressure, d = diameter of reaction bulb) has been calculated. From kinetic theory as shown by Smoluchowski[2] the number of collisions suffered by a molecule in travelling a distance ΔX is

$$z = \frac{3\pi \Delta X^2}{4 \lambda^2} \qquad (1)$$

where λ is the mean free path of the molecule. Assuming that destruction of chain carriers occurs at the walls, the maximum displacement ΔX will be proportional to the diameter d of the bulb. In addition it may be assumed that λ will be inversely proportional to the total pressure at low pressures. Therefore (1) will reduce to

$$z = (\text{constant})\ P^2 d^2 \qquad (2)$$

Since a critical value of z describes the explosion limit, one would expect the product pd to be constant at the limit. The values calculated in Table I show this to be a reasonably good approximation. These points have been plotted (Figure II) and can be seen to fall on the curve calculated for an average pd value in each case.

The same relationship has been shown to be true for various other combustions. N. Semenova[3] obtained pd values for the lower limit of hydrogen-oxygen combustion which checked to within 2.5% in vessels where d was greater than 15 mm. Values were 25% low for a vessel of 6 mm. diameter. Earlier, Hinshelwood and Moelwyn-Hughes[4] studied the same

TABLE I

EXPLOSION LIMITS OF $B(C_2H_5)_3$ IN OXYGEN

(0.05 mole fraction boron triethyl in oxygen.)
(Temperature 0°C.)

Bulb Diameter* d (cm.)	Total Pressure at Limit, p (mm.)	$[B(C_2H_5)_3]$ (mm.)	$[O_2]$ (mm.)	p x d
Clean "dry" pyrex surface:				
4.56	7.5	0.375	7.1	34
6.56	4.3	0.215	4.1	28
7.38	4.1	0.205	3.9	30
9.82	3.1	0.155	2.9	30
12.66	2.1	0.105	2.0	27
Surface self-coated with reaction products:				
4.56	10.7	0.535	10.2	49
6.56	9.0	0.45	8.5	59
7.38	7.3	0.365	6.9	54
9.82	4.7	0.235	4.5	46
12.66	3.6	0.18	3.4	46

* Calculated from the volumes of the near-spherical bulbs.

reaction with considerably less consistent results.

N. Semenoff[5] has investigated the reaction between phosphorus and oxygen. In his experiments the partial pressure of phosphorus was held constant, and it was shown that $P_{O_2}d^2$ should be a constant. His results were in agreement with this. In Dalton and Hinshelwood's[5] work on the reaction between phosphine and oxygen pd varied between 3.1 and 3.9 for surfaces coated with reaction products, while somewhat lower values were obtained with a phosphoric acid coated surface.

From Table I and Figure II it can be seen that the general effect of the reaction product coating was to raise the explosion limit. Another significant difference was that produced on the nature of the visible "flash" produced. This difference is shown for a given diameter bulb in Table II. A decrease in pressure for a clean surface led to a transition from brilliant flashes to dull flashes visible only in a darkened room. Also an occasional anomaly was noted as shown in Table II. The same experiments with "dirty" surfaces completely eliminated this region of "cool" flames leading to a sharp transition to no reaction. It thus seems that the surface of a clean "dry" bulb can possibly catalyze the "cool" flame formation. The function of the reaction products in raising the limit seems to be essentially elimination of this region of barely visible flashes. It also definitely lowers the region of bright green flashes.

A variety of additional surface treatments was carried out. These are shown in Table III. In each case clean bulbs were coated with the material and dried in an oven at 135°. A series of clean bulbs treated in the manner shown was used in locating the limit. As can be seen no strikingly significant differences from the limit produced with a clean pyrex surface were noted.

The initial work (bulb diameter 6.56 cm.) at 25° has led to the qualitative conclusion that a sort of upper limit may exist for the bright green flash observed. Thus, for a constant composition of 5% (0.05 mole fraction) boron triethyl in oxygen the bright green flash was observed from about 10 mm. to 100 mm. total pressure. At pressures above 120 mm. the flashes observed were definitely less brilliant. It was also noted that when the ratio of boron

TABLE II

NATURE OF FLASHES OF BORON TRIETHYL WITH OXYGEN

(0.05 mole fraction of boron triethyl in oxygen.)
(Temperature 0°C. 6.56 cm. bulbs)

Total Pressure (mm.)	Nature of Flash
Clean "dry" pyrex surface:	
19.3	Bright Green
17.6	" "
16.5	" "
15.0	" "
13.6	" "
13.4	" "
12.6	Dull Green
12.0	Faint Bluegreen
11.9	Bright Green
9.2	Bluegreen
8.0	"
6.3	"
4.8	Faint Bluegreen
4.4	" "
4.4	" "
4.2	No Reaction
4.0	" "
Surface self-coated with reaction products:	
13.6	Bright Green
13.6	" "
12.8	" "
10.4	" "
9.4	" "
9.2	" "
9.2	" "
9.0	" "
9.0	No Reaction
9.0	" "
8.8	" "
8.2	" "
6.9	" "
5.8	" "

TABLE III

EFFECT OF SURFACE TREATMENT ON EXPLOSION LIMITS OF BORON TRIETHYL IN OXYGEN

(0.05 mole fraction $B(C_2H_5)_3$ in O_2.)
(Reactant temperature 0°C. 6.56 cm. diam. bulbs.)

Type of Surface	Total Pressure at Limit (mm.)	p x d
Clean "dry" pyrex surface: (oven dried at 135°C.)	4.3	28
Baked pyrex surface: (dried with flame under vacuum)	5.1	33
Surface self-coated with reaction products.	9.0	59
H_3BO_3 (rinsed with saturated solution and oven dried at 135°C.)	4.9	32
Parraffin (rinsed with 1% sol'n in n-pentane and oven dried at 135°C.)	5.0	33
HCl (rinsed with concentrated HCl and oven dried at 135°C.)	5.1	33
KCl (rinsed with 5% solution and oven dried at 135°C.)	4.1	27
KOH (rinsed with 1% solution and oven dried at 135°C.)	4.8	31

triethyl to oxygen was increased at a given total pressure, the brilliance of the flashes diminished. Apparently an increase in boron triethyl concentration has a quenching effect on the radiation.

It may be added that the brilliance of the flash understandably increased with vessel diameter.

Though no detailed determinations of limits at other than 5 volume % were made, explosions were observed over a range from 5-60% boron triethyl at low pressures. It may be added that stoichiometric butane-oxygen mixtures were ignited by small concentrations of boron triethyl. A stoichiometric mixture of n-butane in oxygen (0.133 mole fraction n-C_4H_{10} in O_2) with varying amounts of $B(C_2H_5)_3$ was exploded at a total pressure of 100 mm. The data contained in Table IV show that a very definite explosion

TABLE IV

EXPLOSION OF STOICHIOMETRIC n-BUTANE-OXYGEN MIXTURES WITH $B(C_2H_5)_3$

(Total pressure 100 mm., Temperature 20°)

Pressure $B(C_2H_5)_3$ (mm.)	Pressure C_4H_{10}-O_2 Mixture (mm.)	Nature of Explosion
10	90	Very faint flash
5	95	Faint flash
3	97	Very bright explosive flash
1	99	No reaction

resulted with only about 3% $B(C_2H_5)_3$. Moreover, all the experiments shown in Table IV resulted in a neglible pressure change except the 3% experiment which had a large negative pressure change.

ADDENDUM

Below the explosion limit no visible reaction between boron triethyl and oxygen was apparent. It seems very likely, however, that a reaction of boron triethyl with oxygen (possibly an instantaneous one) does occur. A series of experiments was carried out at low temperatures and pressures to determine the products formed with oxygen. Boron triethyl vapor was metered into a 500 ml. reaction bulb at 20°C., the vapor was then condensed out at -79°C. (carbon dioxide-acetone bath) and an excess of oxygen added slowly. A small amount of oxygen absorption occurred at -79°C. The temperature was then raised to 20° during which time additional oxygen absorption occurred. The mixture was allowed to stand at 20° until a constant pressure (no additional oxygen absorption) resulted. The resulting product was an oily liquid, stable in air at room temperature. For two experiments carried out in this manner analyses were

(1) 9.15 % H, 42.16% C.

(2) 9.74 % H, 45.84% C.

The average value was 9.45% H, 44.00% C. which compares with calculated values of 9.34% H, 44.5% C. for the compound $B(C_2H_5)_3.2\ O_2$. From the pressure data for oxygen consumption enough oxygen was absorbed in both experiments to give an average value corresponding to $B(C_2H_5)_3.1.7\ O_2$. This figure was uncorrected for the vapor pressure of the compound formed. A value of only 10 mm. for the vapor pressure would raise the value to 1.9 or 2.0 O_2.

The same addition compound was titrated for peroxides using the sodium thiosulfate-iodide method. In three experiments in which boron triethyl was reacted with oxygen as above, potassium iodide solution was added to the frozen addition compound, and the mixture allowed to warm to room temperature. The iodine, which was only slowly liberated, was titrated with sodium thiosulfate (starch indicator). The results corresponded to 1.04-1.09 equivalents I per mole $B(C_2H_5)_3$.

The oxygen addition compound would not decolorise $KMnO_4$ after solution in 2% H_2SO_4. On the other hand, when the experiment was repeated without addition of oxygen, there was a reaction with acid permanganate solution. The end-point was not sharp, but about 2.2-2.45 equivalents $KMnO_4$ reacted per mole of $B(C_2H_5)_3$.

There is, therefore, evidence of the formation of an oxygenated intermediate, but its nature is not yet clear.

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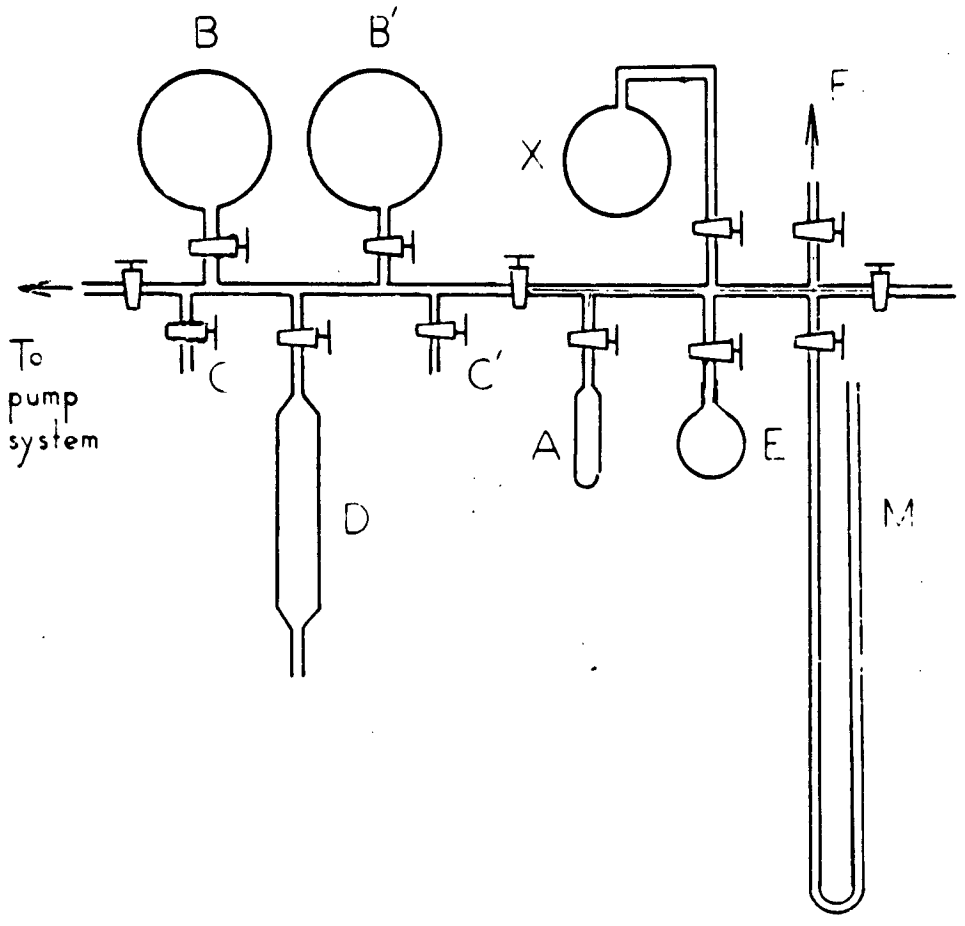
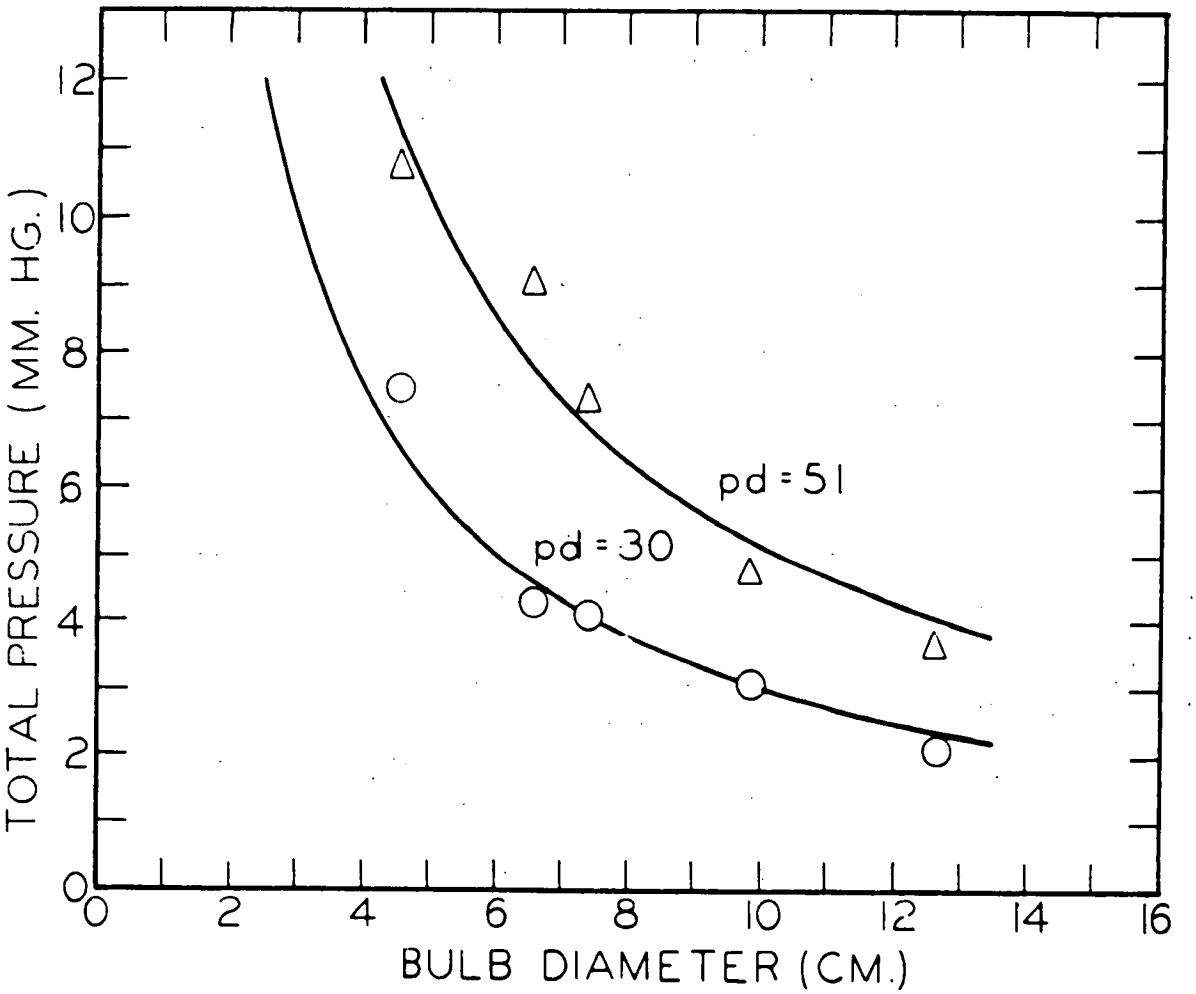


FIGURE 1 APPARATUS



△ Surface self-coated with reaction products.

○ Clean "dry" pyrex surface.

FIGURE II VARIATION OF EXPLOSION LIMIT WITH BULB DIAMETER FOR THE COMBUSTION OF BORON TRIETHYL.

EFFECT OF TEMPERATURE ON THE LOW-PRESSURE IGNITION LIMITS OF n-BUTANE IN AIR AND OXYGEN

By

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Contract NOrd-7920 Task PRN-3

Technical Paper No. 28

July 1, 1947

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Summary

Spark ignition limits for n-butane in air and oxygen have been determined at 25°, 100°, 200° and 300° for downward propagation in a 25 mm. glass tube. The lean limits at 760 mm. are nearly the same in air and oxygen, and are somewhat broadened at higher temperatures. (2.5 to 1.7% C_4H_{10} between 25° and 300° C.). The rich limit in air is moderately increased (6.2 to 7.6% C_4H_{10}), whereas that in oxygen remains nearly constant at about 40% C_4H_{10}. Pressure minima occur near stoichiometric composition in each case. That for air is lowered from 82 to 46 mm. (25° to 300°C.) while that for oxygen is nearly constant at 26 to 29 mm.

Introduction

In Technical Paper No. 5 of this series, data on the ignition of n-butane as a function of pressure at room temperature were presented. In view of the fact that the entering air in a ram-jet is at an elevated temperature, it was of interest to investigate the temperature effect. Results are here reported for ignition in both air and oxygen at 25°, 100°, 200° and 300°C.

Apparatus and Method

The apparatus and method were essentially the same as previously reported. The gases were pre-mixed and introduced into a 25 mm. I.D. Pyrex tube placed vertically with a spark gap at the upper end (downward propagation). Ignition limits were fixed within about 3 mms.

The ignition tube was contained in a somewhat larger tube around which nichrome wire was wound, leaving spaces to permit observation of explosion. This was in turn jacketed by a still larger tube to minimize temperature variation. Mercury thermometers in contact with the outer wall of the explosion tube served for temperature determination.

A two-liquid manometer (toluene-mercury) was used in preparing mixtures in the lower pressure range.

Table I

Pressure Limits for Combustion of n-Butane-Air

(Downward Propagation, Spark Ignition)

Temperature (°C.)	Volume % n-Butane	Pressure Limit (mm. Hg.)
25°	2.2	760
	2.7	120
	3.3	100
	4.0	82
	4.6	85
	5.2	116
	5.4	121
	5.8	304
	6.2	760
100°	2.1	763
	2.4	145
	2.6	122
	3.0	86
	3.7	64
	4.3	65
	5.4	191
	6.8	763
200°	1.7	757
	2.1	187
	2.6	77
	2.8	66
	3.5	53
	4.0	51
	5.0	62
	5.6	105
	5.9	131
	6.4	206
	7.4	757
300°	1.7	752
	2.0	325
	2.2	75
	2.6	58
	3.2	54
	3.7	49
	4.5	46
	5.1	53
	5.7	84
	6.2	108
	6.4	91
	6.7	94
	7.0	124
	7.0	152
	7.2	229
	7.6	758

Table II

Pressure Limits for Combustion of n-Butane-Oxygen

(Downward Propagation, Spark Ignition)

Temp. (°C.)	Volume % n-Butane	Pressure Limit (mm. Hg.)
25°	2.8	755
	3.8	128
	4.8	86
	5.7	47
	8.1	31
	12.5	27
	16.2	28
	19.9	33
	24.6	35
	28.1	87
	30.4	106
	33.0	68
	35.4	164
	37.5	300
	40.1	758
100°	1.9	748
	2.8	79
	3.0	64
	4.1	49
	6.8	28
	8.2	26
	13.1	24
	15.3	26
	19.8	30
	24.8	32
	29.7	81
	30.0	80
	32.4	70
	34.3	77
	38.1	238
	41.3	756
200°	1.7	757
	2.0	438
	2.5	55
	3.5	39
	4.6	34
	6.2	29
	7.3	28
	9.3	26
	15.1	26
	23.0	32
	27.4	56
	29.6	68
	33.5	56
	37.2	67
	39.6	275
	41.3	758
300°	1.7	763
	2.0	137
	2.2	113
	2.8	55
	5.0	31
	8.3	29
	13.9	27
	14.3	31
	15.1	29
	19.9	31
	25.0	38
	29.4	45
	32.4	65
	35.1	62
	36.3	53
	37.6	97

Results

Experimental data are presented in Figures I (air) and II (oxygen) and Tables I and II. In each case it was found that the low-pressure limit came near stoichiometric composition (3.1% in air and 13.3% in oxygen). For the air mixtures, this low-pressure limit was 82 mm. at 25°C. dropping to 46 mms. at 300°C.; whereas for the oxygen mixtures, it remained fairly constant at 26 to 29 mms. The lean limits for air and oxygen mixtures were very similar, both dropping from about 2.5% butane at 25°C. to 1.7% at 300°C. The rich limit for air mixtures was raised from 6.2 to 7.6% (25° to 300°C.), while for oxygen mixtures it was nearly constant at 40 to 41%.

It thus appears that apart from the considerable drop in the low-pressure minimum for near-stoichiometric air mixtures there is relatively little effect of temperature on the ignition limits of n-butane in the 25°-300° range. This is the more remarkable since at 300° and above, the thermal reaction becomes appreciable - a fact which prevents measurements at still higher temperatures. Evidently the critical quantities determining spark sensitivity are not very responsive to temperature change, and are not very directly related to the factors which determine the onset of the normal thermal reaction.

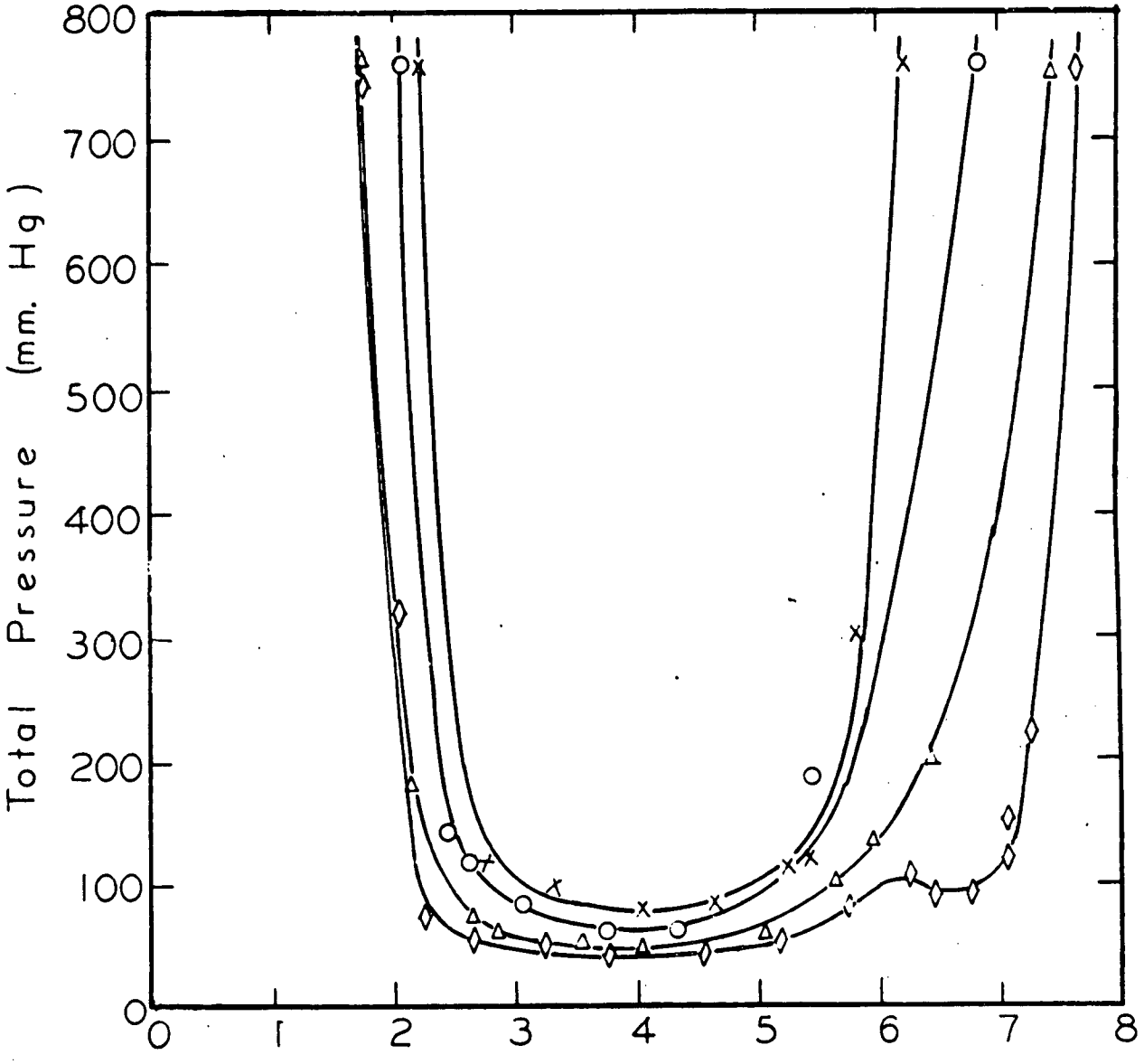

FIGURE 1 PRESSURE LIMITS FOR COMBUSTION OF N-BUTANE IN AIR
(Downward Propagation)

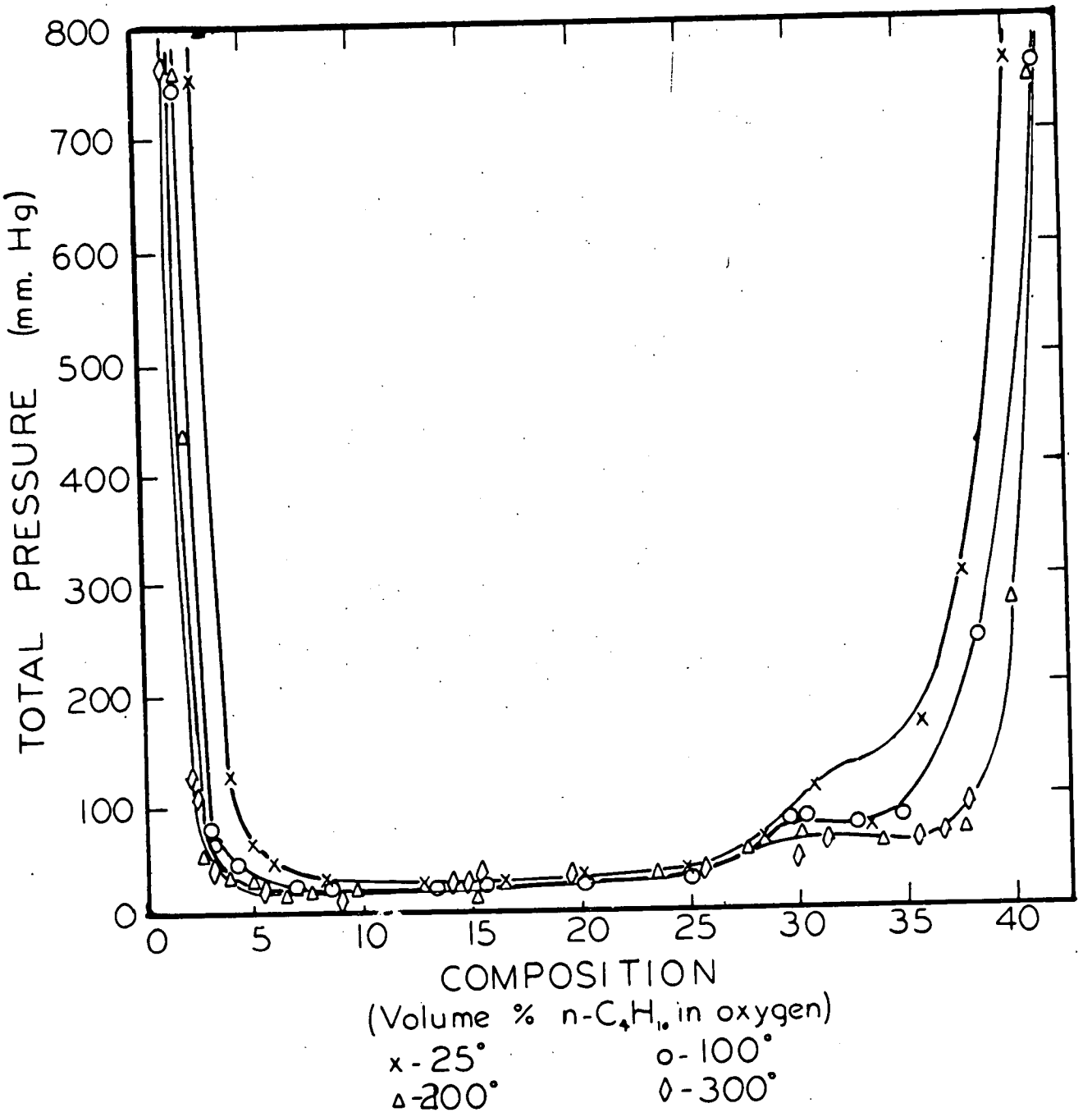

FIGURE 11 PRESSURE LIMITS FOR COMBUSTION OF N-BUTANE IN OXYGEN

(Downward Propagation)

Princeton University
Chemistry Department
July 1, 1947
APL-CF No. _____
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BURNING VELOCITIES OF NITROGEN-OXYGEN-BUTADIENE-1,3 AND HELIUM-OXYGEN-BUTADIENE-1,3 AT REDUCED PRESSURES

By Joseph G. Stuart and Elmer J. Badin

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Contract NOrd-7920, Task PRN-3

Technical Paper No.29

July 1, 1947

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SUMMARY

Burning velocities of nitrogen-oxygen-butadiene-1,3 and helium-oxygen-butadiene-1,3 have been measured at atmospheric and reduced pressures. At atmospheric pressure the ratio of 3.7:1 for the maximum burning velocities was obtained for helium compared to nitrogen as the inert gas. Reduction of pressure caused an increase then a decrease in burning velocity for helium-oxygen-butadiene-1,3. The maximum value of the burning velocity occurred at 300 mm. pressure.

INTRODUCTION

The characteristics of nitrogen-oxygen-butadiene-1,3 flames and helium-oxygen-butadiene-1,3 flames have been studied at reduced pressures with especial regard to burning velocities. It has been previously shown that the burning velocity of a hydrocarbon-air flame increased with decreasing pressure in the range studied.[1] A similar study has been made here with helium substituted for nitrogen. It was anticipated that this substitution, due to large differences in the thermal conductivities, heat capacities and diffusion coefficients of nitrogen and helium, would lead to broader limits and larger burning velocities than those found when air was used as oxidant.

APPARATUS AND METHOD

The metering system and low pressure apparatus used were those described previously[1]. In each case flows were adjusted

to the desired rate at atmospheric pressure and then throttled down to the low pressure. A 10.55 mm. I.D. quartz burner was used for the low pressure measurements. Two cathetometers, one mounted for measuring vertical distances and one mounted for measuring horizontal distances, were used for measuring the dead space, flame cone height and cone base diameter. A second "projection method" was used for determining the flame dimensions. In this method a light-tight box fitted with a transparent screen at the end was mounted directly behind the flame. An 80 mm. diameter, 100 mm. focus double convex lens was mounted in the box so that the flame was just outside the focus. In this way an inverted real image of the stationary flame was cast on the screen and traced on a thin piece of paper. A beam of light was used to obtain a projection of the burner tube of known outside dimension. By using an enlargement factor it was possible to determine all the flame dimensions including the dead space. The method was essentially that used by Garsyth, Forsyth and Townend[2].

Three methods were used for determining the cone areas:-

(1) Calculation using base diameter and flame height on the basis of an ideal cone from the cathetometer measurements.

(2) Calculation as in (1) with measurements taken from the projected image instead of the cathetometer measurements.

(3) Calculation from the projected image by obtaining the lateral areas of frustums into which the projected image was divided.

Burning velocities were calculated using[3]

$$S = V/A$$

where

S = burning velocity in cm. per sec.
V = volume feed rate of flow in $cm.^3$ per sec. at the operating pressure.
A = flame cone area in $cm.^2$ calculated from $\pi r(r^2 + h^2)^{1/2}$

Data for areas and burning velocities (V/A in cm. per sec.) calculated by the above three methods are collected in Table II. In each case burning velocities were based on the outer cone areas. At the lower pressures the reaction zone appears to become thicker. If burning velocities had been based on the inner cone border or an intermediate border, somewhat larger burning velocities would have resulted.

To determine burning velocities at atmospheric pressure a 6.66 mm. I.D. mantled (25 mm. I.D. mantle) quartz burner was used.

Butadiene-1,3 was obtained from the Matheson Company. Helium-oxygen mixtures were obtained from the American Oxygen Company. By gas analyses the helium-oxygen mixture contained

about 21% oxygen (average of several tank mixtures).

RESULTS AND DISCUSSION

In Table I and Figure I data are shown for burning velocities of helium-oxygen-butadiene-1,3 and nitrogen-oxygen-butadiene-1,3 for a 6.66 mm. burner. From these data it can be seen that the ratio of the maximum value for helium as compared with nitrogen is 3.7:1 corresponding to values of 163 and 43.9 cm./sec. There is, thus, a striking increase produced in the burning velocity when helium is substituted for nitrogen.

Data at reduced pressures (a 10.55 mm. diameter burner was used so that lower pressures might be attained) are shown in Table II. The variation of burning velocity with pressure has been plotted from values obtained from graphs of the data in Tables I and II for the composition 3.68 vol.% and 300% butadiene-1,3. For helium-oxygen this correlation indicates an increase in burning velocity with decrease in pressure down to 300 mm. Below this pressure the burning velocity of helium-oxygen-butadiene-1,3 mixtures decreases.

Higher burning velocities in "helium air" have been observed in methane combustion by Coward and Jones[4]. As they point out, the lower heat capacity of helium results in a higher flame temperature. This is borne out by the calculated values given in Table III.

The concentrations of H, O, and OH have also been calculated from the thermodynamic data and are included in Table III. It will be noted that the increase in equilibrium H-atom concentration at either pressure on substituting helium for nitrogen roughly parallels the increase in burning velocity. Assuming that the controlling factor is the back-diffusion of H-atoms from the flame front into unburned gas, an approximate solution indicates that the burning velocities should be given by

$$u = A(c_o D)^{1/2}$$

where

A = a coefficient depending on mixture composition;
c_o = equilibrium H-atom concentration at flame temperature;
D = coefficient of diffusion for H-atoms into unburned gas.

This equation is roughly obeyed (Table IV) when account is taken of the somewhat greater diffusibility into "helium air". The higher flame velocities at lower pressures follow from the increase in diffusion coefficients (greater mean free path).

Table I

BURNING VELOCITIES OF NITROGEN-OXYGEN-BUTADIENE-1,3 AND HELIUM-OXYGEN-BUTADIENE-1,3 AT ATMOSPHERIC PRESSURE

(6.66 mm. I.D. quartz mantled burner)

Oxidant Rate (l/min.) *	C_4H_6-1,3 Rate (l/min.) *	Vol.% C_4H_6-1,3	Flame base diam. (mm.)	Flame height (mm.)	Burning Velocity (cm./sec.)
Helium-oxygen:					
12.9	0.35	2.86	lower limit		
	0.39	3.18	6.80	14.7	126.
	0.47	3.81	6.70	12.8	148.
	0.55	4.02	6.70	12.5	153.
	0.62	4.96	6.70	11.7	163.
	0.72	5.70	6.70	11.8	161.
	0.78	6.16	6.70	12.3	157.
	0.83	6.51	6.70	13.4	146.
	0.91	7.10	6.80	14.8	138.
	0.99	7.79	upper limit		
Nitrogen-oxygen:					
4.00	0.121	2.93	lower limit		
	0.139	3.36	7.6	14.85	37.9
	0.151	3.64	7.4	13.80	41.9
	0.163	3.92	7.2	13.55	43.9
	0.171	4.10	7.2	13.50	44.3
	0.187	4.48	7.4	14.50	40.3
	0.200	4.76	7.6	16.15	35.4
	0.216	5.13	7.8	18.70	29.9
	0.277	5.38	upper limit		

* Rates at 25°, 760 mm. pressure.
Stoichiometric mixture - 3.68 vol.% C_4H_6.

TABLE II. BURNING VELOCITIES OF BUTADIENE-1,3 IN NITROGEN-OXYGEN AND HELIUM-OXYGEN AT REDUCED PRESSURES
(10.55 mm. quartz burner)

Pressure (mm.Hg.)	FLOW RATES* Oxidant	C_4H_6-1,3	Volume % C_4H_6-1,3	CONE AREAS (cm^2) (1)	(2)	(3)	BURNING VELOCITIES (cm/sec.) (1)	(2)	(3)
Helium-Oxygen:									
180	14.0	0.40	2.79	2.09	1.43	1.98	115	168	121
180	14.0	0.61	4.16	1.67	1.49	1.54	146	163	158
180	14.0	0.74	5.04	1.97	1.63	2.02	125	151	122
180	14.0	0.83	5.62	2.67	2.41	2.87	92.6	102	86.1
300	14.0	0.39	2.69	1.72	1.64	1.65	139	146	146
300	14.0	0.47	3.28	1.32	1.48	1.50	183	163	161
300	14.0	0.60	4.09	1.35	1.51	1.44	180	161	169
300	14.0	0.73	4.92	1.97	1.85	1.56	125	133	157
450	14.0	0.36	2.50	1.95	1.89	2.11	123	127	115
450	14.0	0.41	2.85	1.63	1.63	1.68	147	147	142
450	14.0	0.86	5.76	2.12	2.06	2.10	117	120	118
450	14.0	0.96	6.41	3.15	2.92	3.04	79.1	85.4	81.9
Nitrogen-Oxygen:									
300	14.0	0.50	3.43	4.34	4.38	4.11	55.7	55.0	58.8
300	14.0	0.54	3.68	4.31	4.07	4.23	56.2	59.7	57.3
300	14.0	0.66	4.47	5.15	5.06	5.09	47.4	48.3	48.0
450	14.0	0.53	3.63	4.88	4.98	5.04	49.6	48.6	48.2
450	14.0	0.61	4.19	6.79	4.80	4.92		50.8	53.7

See notes on next page.

(Footnotes from Table II)

* All flow rates are given at the pressure indicated in liters per minute.

(1) The height and diameter at the base of the flame determined by cathetometer and the area determined by

$$A = \pi r(r^2 + h^2)^{1/2}$$

(2) Dimensions determined by projection and area calculated as in (1).

(3) Dimensions determined by projection, area calculated by dividing the flame outline into frustums of cones and making a summation of the surface area using 1/2 (sum of the perimeters) (slant height) to determine the area of each frustum.

Table III

CALCULATED RADICAL CONCENTRATIONS FOR BUTADIENE-1,3 FLAMES IN HELIUM-OXYGEN AND NITROGEN-OXYGEN

(Stoichiometric composition: 3.68% butadiene-1,3)

Inert Gas	Total Pressure (atm.)	Burning velocity (expt.) (cm/sec.)	Calculated equilibrium Flame Temperature (°K)	Radical Concentrations (atm.)		
				H	O	OH
N_2	1	43.	2380.	0.00088	0.00086	0.0039
He	1	143.	2660.	0.00430	0.00470	0.0115
N_2	1/2	53.	2350.	0.00057	0.00057	0.00233
He	1/2	179.	2600.	0.00264	0.00273	0.00600

Table IV

COMPARISON BETWEEN EXPERIMENTAL AND CALCULATED BURNING VELOCITY RATIOS

	$\frac{He}{N_2}$ expt.	$\frac{He}{N_2}$ cal.	$\frac{1 \text{ atm.}}{1/2 \text{ atm.}}_{expt.}$	$\frac{1 \text{ atm.}}{1/2 \text{ atm.}}_{cal.}$
Total pressure, 1 atm.	3.3	3.2	----	-----
Total pressure, 1/2 atm.	3.4	3.1	----	-----
Inert gas, N_2	---	----	0.81	0.88
Inert gas, He	---	----	0.80	0.90

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1. "Cone Areas and Burning Velocities of Butadiene-1,3 Air Flames at Subatmospheric Pressures," Technical Paper 10, May 25, 1946.

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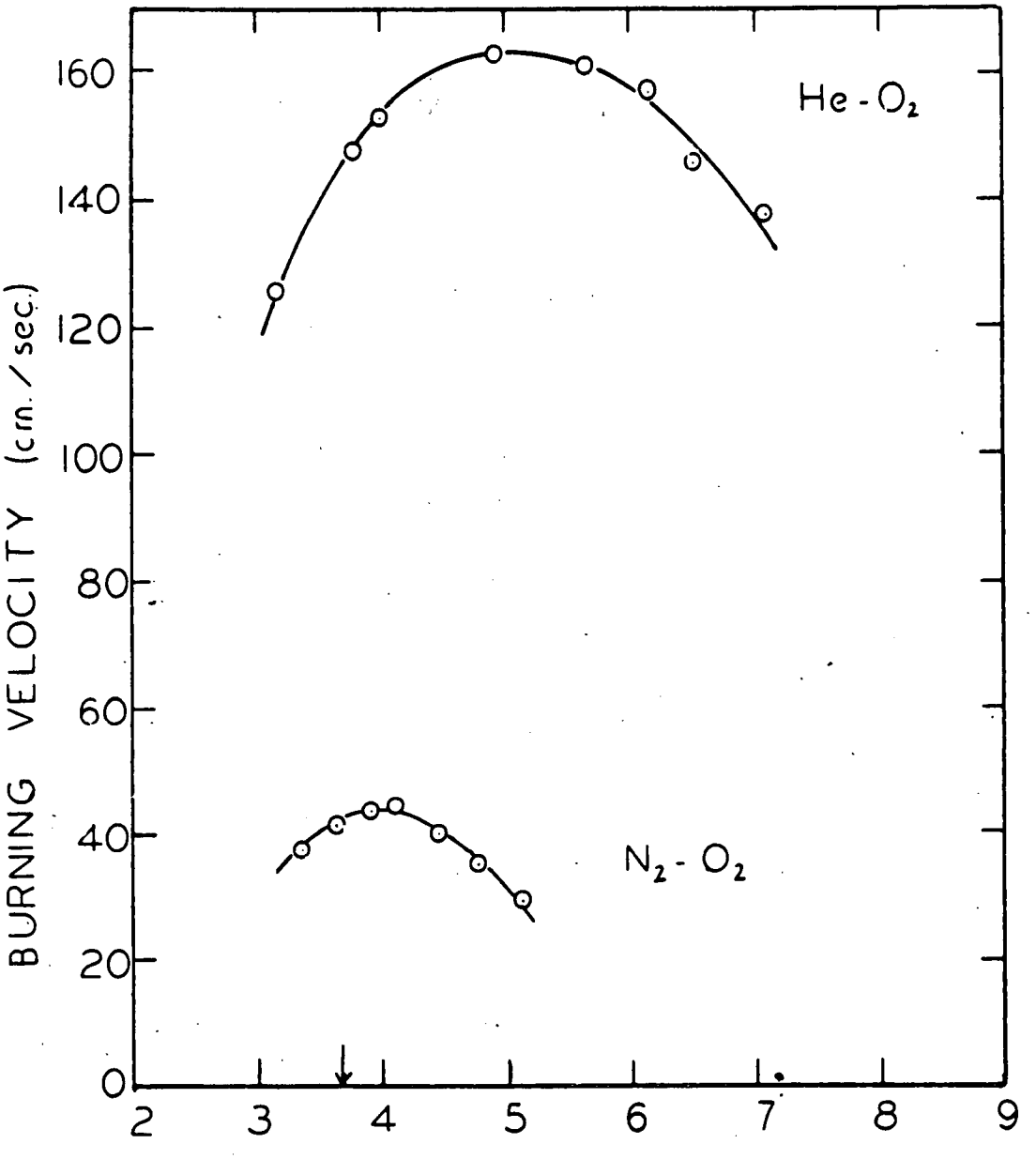

FIGURE 1 BURNING VELOCITIES OF BUTADIENE - 1,3

(6.66 mm. I.D. quartz mantled burner)

(atmospheric pressure)

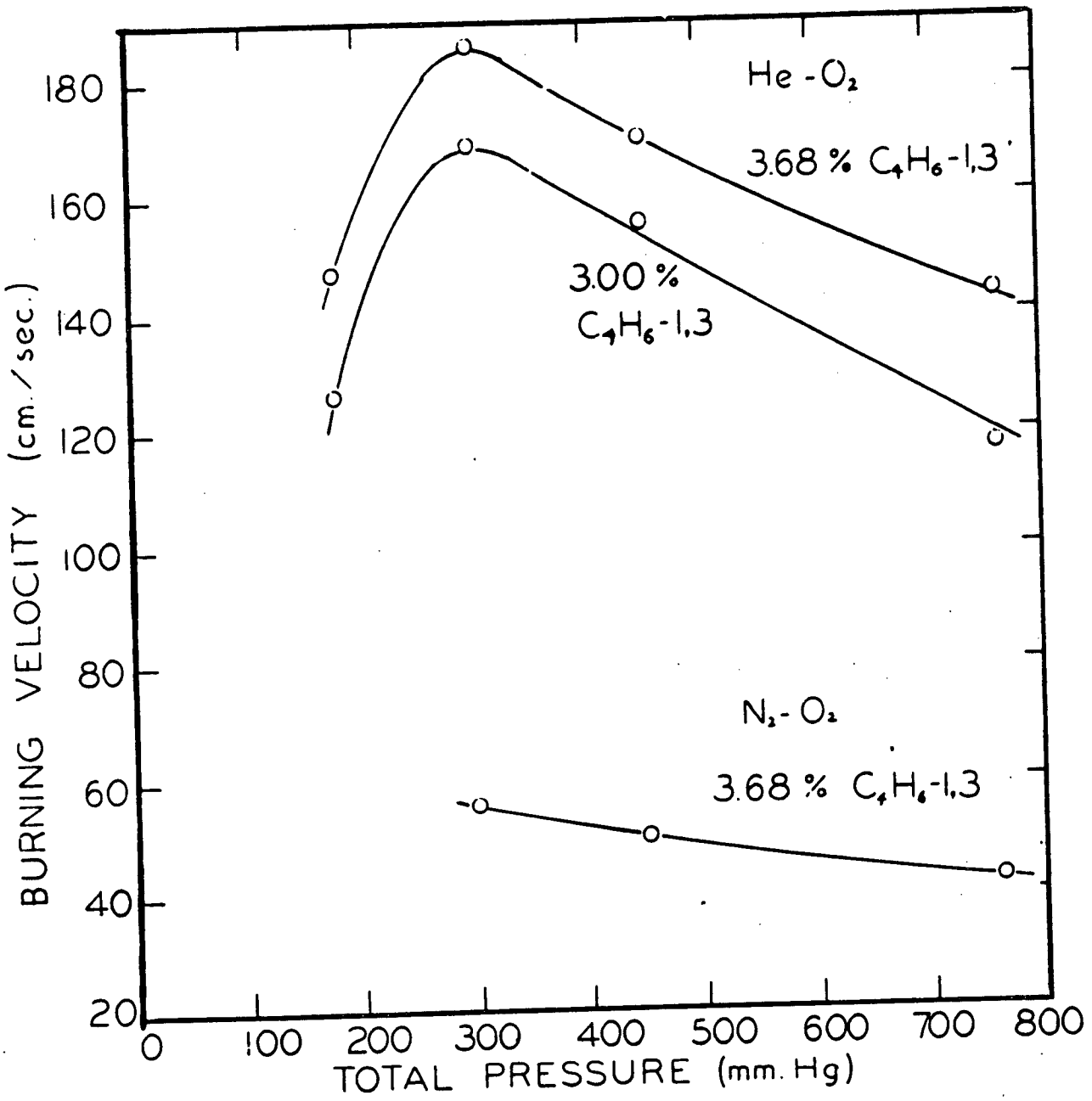

FIGURE 11 VARIATION OF BURNING VELOCITY OF BUTADIENE-1,3 WITH PRESSURE

(cathetometer measurements)

(points at 760 mm., 6.66 mm. burner; other values using 10.55 mm. burner)

IONIZATION FLAME DETECTOR

By

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Combustion Research

Jointly sponsored by-

Project Bumblebee, Bureau of Ordinance, Navy Dept., Applied Physics Laboratory, Contract NOrd-7920, Task PRN-3

Project Squid, Bureau of Aeronautics and Office of Naval Research, Navy Dept., Contract N6-ori-105, Task Order III, Phase 2

Technical Paper No. 30

July 1, 1947

SUMMARY

An extremely simple method of detecting ionization in flames utilizing the flame conductivity without the introduction of probes into the flame is described for use in the measurement of flame speeds. The apparatus consists of two pieces of aluminum foil around the outside of a glass combustion tube, a large resistance, and a source of D.C. voltage. The small currents caused to flow in the flame between the exterior aluminum electrodes produces a flow of current through the resistance. The voltage pulse thus created is used to trigger an electronic chronoscope. Two distinct advantages of the method are: (1) its extreme simplicity, and (2) the direct measurement of flame speeds without the introduction of electrodes or screen wires into the combustion tube.

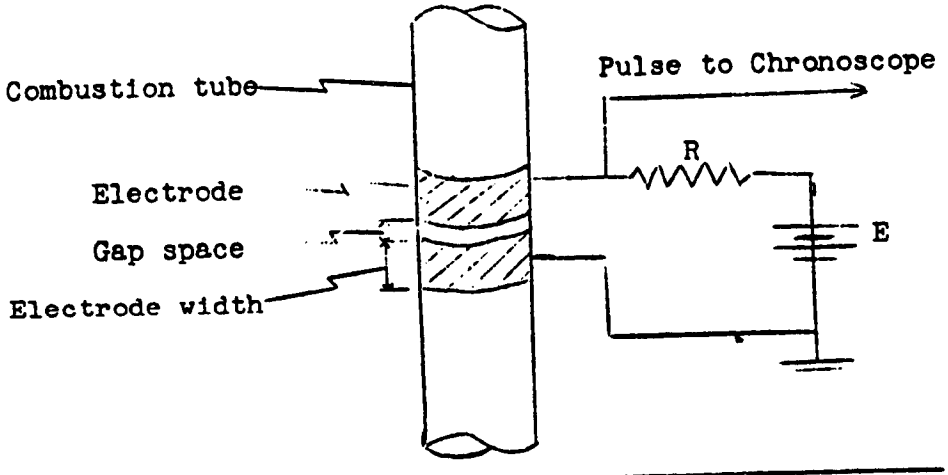
INTRODUCTION

In a recent paper[1] describing the high frequency oscillator as a flame detector the disadvantages of the various electrical methods of flame detection were reviewed and a new method presented which avoided particularly the necessity for introducing probes or other devices into the combustion tube. The method described below has, in addition to this advantage, the advantage of its extreme simplicity. It consists of only two pieces of metal foil, a high resistance, and a source of D.C. potential.

DESCRIPTION OF METHOD

The experimental arrangement used is shown in Fig I.

Fig. I



The electrodes were aluminum foil 5/1000 inch thick and 0.7 to 5.6 cm. wide wrapped around the outside of the combustion tube. The resistance R was either 7 or 10 megohms,

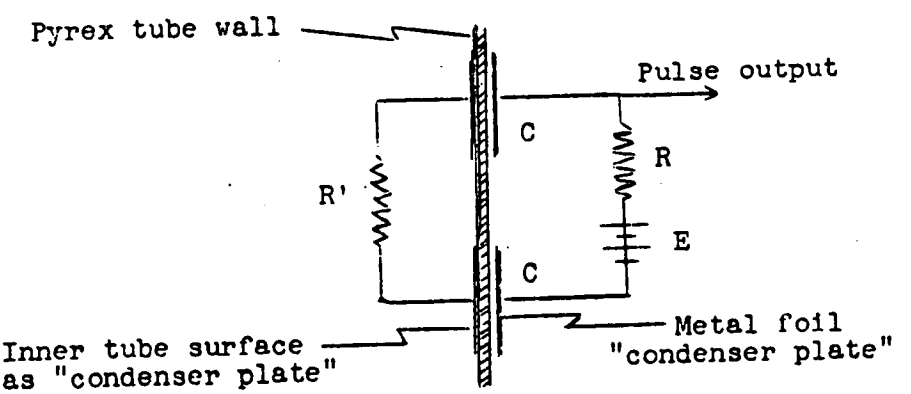
and the source of D.C. voltage was a variable regulated rectifier power supply. For the measurement of flame speeds two such devices were used to trigger an electronic chronoscope.[2] "on" and then "off".

DESCRIPTION OF CIRCUIT OPERATION

The detector does not act due to a change in the capacity between the electrodes as one might at first assume. An analysis of the circuit shows that a decrease in capacity due to ion formation would produce a positive pulse. The pulse actually obtained is negative as seen on a cathode ray oscilloscope screen and as deduced by its ability to trigger the electronic chronoscope previously described.[2]

This detector may be assumed to operate due to the momentary migration of charged particles (ions and electrons) in the electric field between the electrodes. The equivalent electrical circuit would be as shown in fig. II.

Fig. II



The two condensers are formed by the two metal electrodes and the glass surface inside the tube opposite each electrode.(3) The resistance R' represents the resistance between the two inner glass surface "condenser plates". With no flame in the detector R' will be determined by the surface resistance of the glass and will be very large. The presence of ions in the flame will reduce this resistance when the flame passes through the detector so that a very small current ($\sim 10^{-6}$ amperes) will flow in the circuit producing a voltage drop of the proper sign across R.

OBSERVATION OF OUTPUT PULSE

In order to characterize the new flame detector it was necessary to determine the size of the output voltage pulse. This was done by photographing the pulse on a cathode ray oscilloscope screen and in some cases by visual observation of the pulse on the oscilloscope screen. Since the pulse was taken from across a 10 megohm resistance and the C.R.O. input is only 1 megohm it was necessary to use some type of impedance matching device. For this purpose a cathode follower circuit employing a 6J5 triode was constructed.

The photographs of the transients were obtained with a standard type three inch oscilloscope (Dumont 164-E) and a Leica camera having an f 2.5 lens.* This was accomplished by blocking out the stationary light trace on the oscilloscope

*The writer wishes to express his appreciation to Mr. R. S. Brown for the use of his camera.

screen with a narrow strip of black paper. The camera lens was shielded from light by a blackened glass tube between the C.R.O. screen and the camera, so that operations could be carried out in daylight. The camera lens was opened prior to the transient to be recorded and closed after the phenomena had taken place.

CHARACTERIZATION OF DETECTOR

A few preliminary observations of the effect of varying various parameters on the size and type of pulse obtained from the detector are presented below.

The effect of varying the electrode width and the gap space is shown in table I. The output voltage increases with increasing electrode width and decreases with increasing gap width, possibly going through a maximum.

TABLE I

3.13% n-Butane in Air at 200 mm pressure

E = 700 volts R = 10 megohms

Electrode Width cm.	Gap Space cm.	Peak Pulse Voltage
0.7	0.1	2.0
1.9	0.1	3.8
5.6	0.1	4.5
5.6	0.2	4.8
5.6	0.5	3.3

The effect of the power supply voltage is demonstrated in table II. An increase in power supply voltage causes an in-

crease in the output pulse voltage.

TABLE II

3.13% n-Butane in Air at 200 mm pressure

R = 7 megohms, Electrode width = 1.0 cm., Gap space = 0.1 cm

Voltage Across Detector	350	600	700
Peak Pulse Voltage	0.42	1.4	1.5

A comparison of this flame detector with the high frequency oscillator detector is presented in table III. Although the new detector has the advantage of simplicity, it is less sensitive than the oscillator detector.

TABLE III

R = 10 megohms, E = 700 volts, 3.13% n-Butane in Air

Pressure mm. Hg	Peak Pulse Voltage Oscillator Detector	Present Detector
150	9.0	---
200	8.0	4.5
300	8.5	---
500	10.0	4.3

In an oxygen mixture at a considerably lower pressure the output pulse is much larger than in the air mixtures above.

A mixture of 15.5% n-Butane in oxygen at 42 mm of Hg pressure, with the detector described in table II (E = 600 volts), gave a voltage pulse of 18 volts.

The flame speeds in the air mixtures were of the order of 60 cm/sec. and the pulse width at the base approximately 40 milliseconds. The pulses came to a point and were symmetrical. Several times, particularly at higher pressures, two pulses were observed. In the oxygen mixture the flame speed was approximately 9,000 cm./sec. and the electrical disturbance was actually a group of very sharp pulses over a period of approximately 40 milliseconds.

In some cases the flame appeared to show a slight vibration as it passed the new detector. This was never observed with the oscillator detector. Nevertheless, the flame speeds measured by the two methods agree within the experimental error (less than 2%).

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THE REACTION BETWEEN ATOMIC HYDROGEN AND MOLECULAR OXYGEN

By

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Technical Paper No. 31

July 1, 1947

SUMMARY

Atomic hydrogen from a Wood's hydrogen discharge tube has been reacted with molecular oxygen at low temperatures and pressures. With an excess of hydrogen at liquid nitrogen temperature a good yield of hydrogen peroxide was obtained, but at "dry ice" temperature the yield is zero. It is concluded that at the low pressures involved (about 0.2 mms.) the reaction takes place largely on the surface.

INTRODUCTION

The reaction between atomic hydrogen and molecular oxygen has been studied as being of basic interest for combustion mechanisms. Data for this study are contained in this paper with atomic hydrogen produced by electrical discharge.

APPARATUS AND METHOD

The apparatus used is diagrammed in Figure I. The discharge tube G was constructed of 20 mm. O.D. pyrex glass and was coated with phosphoric acid down to point x. Two hollow cylindrical electrodes F and F' (length 20 cm., diameter 27 mm.) made of thin aluminum sheet with sealed in tungsten leads were used for supplying the potential necessary to dissociate the hydrogen. The leads were connected to a transformer which at atmospheric pressure would supply a voltage of ~25,000 volts (frequency 150 sec^{-1}). The total length of the discharge tube was approximately 2.5 meters.

Hydrogen was supplied through throttling stopcocks C and C' from the electrolyzer E. The U-tube electrolyzer was fitted with two platinum electrodes of large area. The electrolysis liquid was a 10% solution of H_3PO_4 and H_2SO_4. By varying the current any desired rate of hydrogen could be obtained. The hydrogen was introduced without drying.

Oxygen was introduced through a flowmeter system consisting of a variable-head water column N, flowmeter M and static manometer L. By varying the height of the water column a constant flow of oxygen could be obtained. The flowmeter M was of the capillary type calibrated by mercury displacement for the range 0 to 40 cc./min. at S.T.P. Oxygen was passed into the apparatus through stopcocks D and D' which were throttled down so as to maintain a zero reading on the static manometer L. Water was used as the liquid in both manometer L and flowmeter M.

In carrying out an experiment the entire apparatus was evacuated to 10^{-4} or 10^{-5} mm. (McLeod gauge 2). Hydrogen was then introduced by opening C and C' sufficient to maintain the liquid level in E constant. From the quantity of electricity used the amount of hydrogen could be calculated. The partial pressure of H_2 was read on McLeod gauge 1 (calibrated for the range 0-1.00 mm.). Oxygen was then introduced by opening D and D' and the total pressure read. The reaction tube A and trap B were then immersed in baths of the required temperature and the discharge turned on. At the end of an experiment trap A was disconnected, 25 ml. of 2% sulfuric acid added and the peroxide formed titrated with standardized N/10 potassium permanganate. In each case a sharp end point was obtained. The amount of peroxide adherring to the tubes X was washed off and also titrated. The major portion of peroxide formed was condensed on the walls of trap A. On warming to room temperature it appeared in the form of slightly viscous drop-

lets. In determining the amount of water produced the trap was first weighed and then titrated; water was determined by difference.

The concentric reaction tubes leading into trap A were made of 17.5 mm. O.D. and 8.0 mm. O.D. tubing respectively. Traps A and B were connected by about 80 cm. of untreated 17 mm. O.D. pyrex tubing.

A helium-oxygen mixture containing 23% oxygen (quantitative absorption in Oxsorbent) was obtained from the American Oxygen Co. Calibration of flow rates for the helium-oxygen mixture was carried out as for oxygen.

RESULTS AND DISCUSSION

Data are contained in Table I for peroxide and water formation from the reaction of atomic hydrogen with oxygen at various temperatures.

TABLE I

VARIATION OF H_2O_2 AND H_2O PRODUCED WITH TEMPERATURE

Time, 1200 sec. Total pressure 0.27 mm.
H_2 - 20.9 cc./min. STP pressure 0.24 mm.
O_2 - 2.55 cc./min. STP

Trap A (main reaction trap)					Trap B (80 cm. from A.)				
Temp. °C.	H_2O_2 formed milli-moles	H_2O_2 formed per cent*	H_2O formed milli-moles	H_2O formed per cent*	Temp. °C.	H_2O_2 formed milli-moles	H_2O_2 formed per cent*	H_2O formed milli-moles	H_2O formed per cent*
20	0	0	0	0	-196	0	0	0.18	4
-79	0	0	1.06	23	-196	0	0	0	0
-196	0.765	33.5	0.82	18	-196	0	0	0	0

* % yield on basis of oxygen introduced.

Table I shows the following:

(a) When atomic hydrogen and oxygen react at 20° and the products are condensed at -196° no peroxide and a small amount of water only are formed.

(b) At -79° reaction temperature no peroxide is formed but an appreciable amount of water results.

(c) At -196° reaction temperature most of the oxygen is converted to peroxide. Some water is also formed.

If the initial step for peroxide formation were

$$H + O_2 \rightarrow HO_2 \qquad (1)$$

occurring in the gas phase, one would expect formation of H_2O_2 even at -79° or higher. Since this does not occur, reaction (1) is apparently not involved. Geib and Harteck have previously shown that the amount of peroxide formed gradually decreases to zero at -80° as the temperature is raised. Geib[2] has proposed the mechanism

$$W + H \rightleftharpoons WH \qquad (2)$$

$$(WH + H \rightleftharpoons W + H_2) \qquad (2')$$

$$WH + O_2 \longrightarrow WHO_2 \qquad (3)$$

$$WHO_2 + H \longrightarrow W + H_2O_2 \qquad (4)$$

with the assumption that the activation energy for H_2O_2 formation is about zero.

Analogous results have been reported by Rodebush, Keizer, McKee and Quagliano [3] for the products of a discharge in water vapor. However, the results differ in that an appreciable amount of water is formed at -79° in the experiments here. Both Geib [2] and Rodebush, Keizer, McKee and Quagliano [3] conclude that the reactions are heterogeneous. For water formation Geib [2] has proposed a homogeneous three body collision mechanism:

$$H + O_2 + H_2 \longrightarrow H_2O + OH \qquad (5)$$

$$H + O_2 + M \longrightarrow HO_2 + M \qquad (6)$$

$$HO_2 + H_2 \longrightarrow H_2O + OH \qquad (7)$$

Since some water is formed at the higher temperatures this would seem to apply.

TABLE II: REACTION OF ATOMIC HYDROGEN WITH MOLECULAR OXYGEN (Reaction temp., -196°C.)

Time (sec.)	Hydrogen introduced cc/min. STP	Hydrogen introduced milli-moles	Hydrogen introduced Partial press. (mm.)	Oxygen introduced cc/min. STP	Oxygen introduced milli-moles	Total press. (mm.)	Ratio (milli-moles) O_2:H_2 introduced	H_2O_2 formed milli-moles	H_2O_2 formed %[1] yield	H_2O_2 formed Average rate (milli-moles/sec)
Variation of O_2:H_2 ratio:										
1200	20.9	18.7	0.24	0	0	0.24	0	0.057	---	0.05×10^{-3}
1200	20.9	18.7	0.24	1.00	0.89	0.24	0.848	0.048	95.2	0.71×10^{-3}
1200	20.9	18.7	0.24	1.30	1.16	0.25	0.062	0.763	66.1	0.64×10^{-3}
1200	20.9	18.7	0.24	2.55	2.28	0.27	0.122	0.765	33.5	0.64×10^{-3}
1200	20.9	18.7	0.24	5.81	5.18	0.33	0.279	0.920	17.8	0.77×10^{-3}
1200	20.9	18.7	0.24	11.7	10.4	0.39	0.562	0.47	4.6	0.39×10^{-3}
1200	20.9	18.7	0.24	20.9	18.7	0.55	1.00	0.189	1.0	0.16×10
Variation of reaction time:										
300	20.9	4.67	0.24	2.55	0.57	0.27	0.122	0.208	36.5	0.69×10^{-3}
600	20.9	9.35	0.24	2.55	1.14	0.27	0.122	0.395	34.5	0.65×10^{-3}
1200	20.9	18.7	0.24	2.55	2.28	0.27	0.122	0.765	33.5	0.64×10^{-3}
1800	20.9	28.1	0.24	2.55	3.42	0.27	0.122	1.14	33.3	0.63×10^{-3}
2400	20.9	37.4	0.24	2.55	4.55	0.27	0.122	1.52	33.4	0.63×10^{-3}
Variation of H_2 rate:										
1200	10.4	9.3	0.14	2.55	2.28	0.18	0.245	0.535	23.5	0.45×10^{-3}
1200	13.9	12.4	0.17	2.55	2.28	0.21	0.184	0.640	28.1	0.53×10^{-3}
1200	20.9	18.7	0.24	2.55	2.28	0.27	0.122	0.765	33.5	0.64×10^{-3}
1200	27.9	24.9	0.30	2.55	2.28	0.32	0.092	0.785	34.4	0.65×10^{-3}

(1) Yield calculated on basis of oxygen introduced.

In the first set of data in Table II and in Figure II conversions to H_2O_2 of amounts from 1.0 to 95.2 percent of the oxygen introduced are shown. The presence of an increased amount of oxygen in the gas phase leads to greatly reduced peroxide formation.

The greatly decreased yield with additional oxygen is probably due to deactivation of hydrogen atoms by recombination in the vapor phase.

$$H + H + O_2 \qquad H_2 + O_2, \ (E_a = 0) \qquad (8)$$

With excess oxygen this can occur to a much greater extent, leading to a decrease in the H-atom concentration. In addition, back-diffusion of the oxygen would also lead to a smaller H-atom concentration at the point of mixing of the gases. In the first four experiments of Table II the rate of formation of H_2O_2 remains substantially constant at 0.64 - 0.77 millimoles per second for a wide range of oxygen concentration, indicating that, in this region, the rate of peroxide formation is independent of the oxygen concentration. With a further increase in the amount of oxygen the rates and yields drop greatly, indicating that some reaction such as (5) occurs. The amount of H_2O_2 formed was practically linear with time as shown in Figure III, although there was a slight decrease in both rate and yield (Table II) as the time increased.

Data in Table III show that peroxide formation is accompanied with water formation.

TABLE III

WATER AND PEROXIDE FORMATION

(Time, 1800 sec.; Reaction temperature, -196° C.; H_2 - 20.9 cc./min. STP, partial pressure 0.24 mm.)

Total press. (mm.)	Oxygen introduced cc./min. STP	Oxygen introduced millimoles	Ratio millimoles O_2:H_2 introduced	H_2O_2 formed millimoles	H_2O_2 formed %[1]	H_2O formed millimoles[2]	H_2O formed %[1]
0.24	1.00	1.34	0.048	1.08	81.	0.67	~20.
0.27	2.55	3.41	0.122	1.13	33.	1.22	18.
0.39	11.7	15.7	0.562	0.604	3.9	0.61	1.9
0.55	20.9	28.1	1.00	0.189	0.7	0.70	1.2

(1) Yield calculated on basis of oxygen introduced.
(2) Accuracy ± 0.15 millimoles.

In no case, except at very low ratios of O_2:H_2 introduced, is all the oxygen accounted for indicating considerable escape of unchanged molecular oxygen.

A set of experiments has been carried out in which a portion of the oxygen introduced has been replaced by an inert non-condensible gas, helium. These results are collected in Table IV.

TABLE IV

EFFECT OF HELIUM ON H_2O_2 FORMATION

(Reaction temperature -196°C.)
(H_2 - 20.9 cc./min. STP, partial press. 0.24 mm.
Time - 1200 sec.)

Oxidant cc/min. STP	millimoles O_2	millimoles He	Total press. (mm.)	Ratio moles O_2:H_2 introduced	H_2O_2 formed millimoles	H_2O_2 formed % yield	Average rate millimoles/sec. x 10^4
2.55	2.28	0	0.27	0.12	0.765	33.5	6.4
2.55	0.52	1.76	0.27	0.028	0.485	92.5	4.0
5.81	5.18	0	0.33	0.28	0.920	17.8	7.7
5.81	1.19	3.99	0.33	0.072	0.905	76.1	7.5
11.7	10.4	0	0.39	0.56	0.473	4.6	3.9
11.7	2.40	8.05	0.39	0.13	0.560	23.3	4.7
20.9	18.7	0	0.55	1.00	0.189	1.0	1.6
20.9	4.30	14.4	0.55	0.23	0.204	4.8	1.7

Excluding the first set of data in which practically all the oxygen present in the helium mixture has been consumed, it is seen that for each of the other cases the rate of peroxide formation is substantially constant but that in each case, with helium present, the percentage of peroxide calculated on the basis of oxygen is on the average 4.7 times as great. Substitution of helium for oxygen thus allows a greater relative concentration of oxygen to react.

The explanation for this is probably that substitution of a portion of the oxygen by helium minimizes reaction (8) so that

(1) Yield calculated on basis of oxygen introduced.

a greater concentration of H-atoms can react. The greatly increased ability of H-atoms to diffuse through helium would also tend to account for the observed results.

It can not be decided with certainty whether the mechanism of the reaction is as outlined in steps (2), (2'), (3) and (4). However, peroxide formation by a heterogeneous reaction probably does occur. This does not immediately seem reconcilable with results obtained in the mercury sensitized-photochemical reaction. For this homogeneous reaction the mechanism proposed by Taylor and Marshall[4]

$$H + O_2 \longrightarrow HO_2$$

$$HO_2 + H_2 \longrightarrow H_2O_2 + H$$

$$H + H \longrightarrow H_2$$

has been shown to apply. However, no necessary discrepancy need exist. The hydrogen atom concentrations in experiments using the discharge as source are much higher*, hence recombination in the gas phase is favored. Also, the pressures are much lower favoring the wall as a third body, except with an increase in the oxygen concentration.

SUMMARY

(1) A study of the reaction between atomic hydrogen and oxygen has been carried out. Conversions of oxygen to hydrogen peroxide of from 1 to 95 percent, depending on the O_2:H_2 ratio, introduced have been obtained.
(2) The formation of hydrogen peroxide has been shown to be essentially linear with time with a slight decrease in yield and rate as the reaction progresses.
(3) Addition of helium increases the amount of oxygen converted to peroxide while maintaining the same rate of formation; the reaction, thus, is independent of the oxygen pressure.
(4) The reaction between hydrogen atoms produced by electrical discharge and molecular oxygen to form hydrogen peroxide is a heterogeneous one.

---

*The H-atom concentration was unknown in these experiments. If one makes the rather improbable assumption, as pointed out by Bonhoeffer and Boehm[5], that all hydrogen found in the H_2O and H_2O_2 existed as atomic hydrogen, the concentration would be of the order of 8 percent of the total hydrogen pressure. In the mercury sensitized photochemical reaction this is of the order of $<< 8$ percent.

REFERENCES

(1) Geib and Harteck, Ber., 65 1550 (1932)

(2) Geib, Ergeb. d. ex. Naturwis. 15, 44 (1936)

(3) Rodebush, Keizer, McKee, and Quagliano, J. Am. Chem. Soc. 69, 538, (1947)

(4) See e.g. Taylor and Marshall, Nature, 112, 937 (1923) Bates and Taylor, J. Am. Chem. Soc., 49, 2438, (1927)

(5) Bonhoeffer and Boehm, Z.f. phys. Chem. 119, 385, (1926)

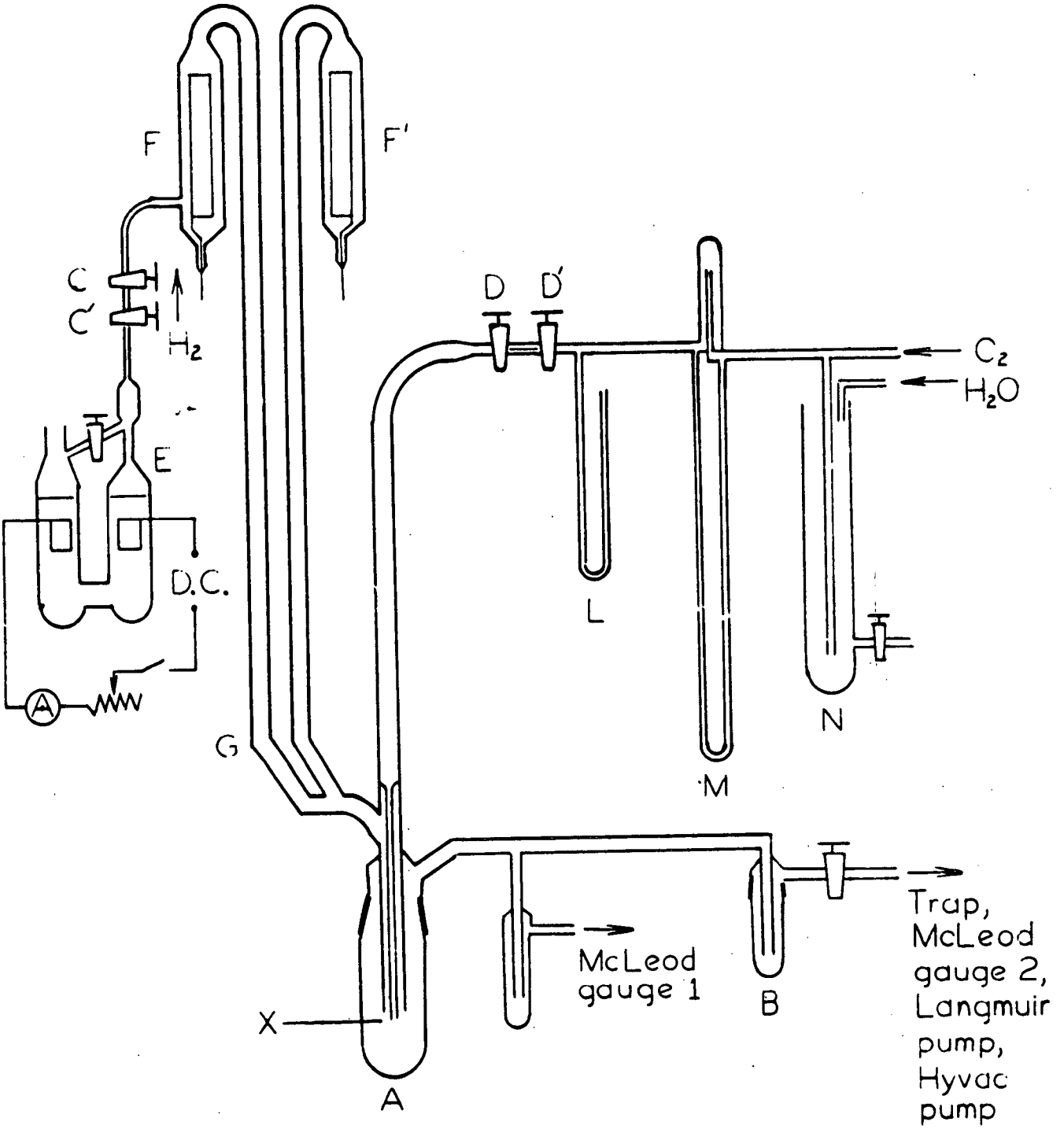


FIGURE 1 APPARATUS

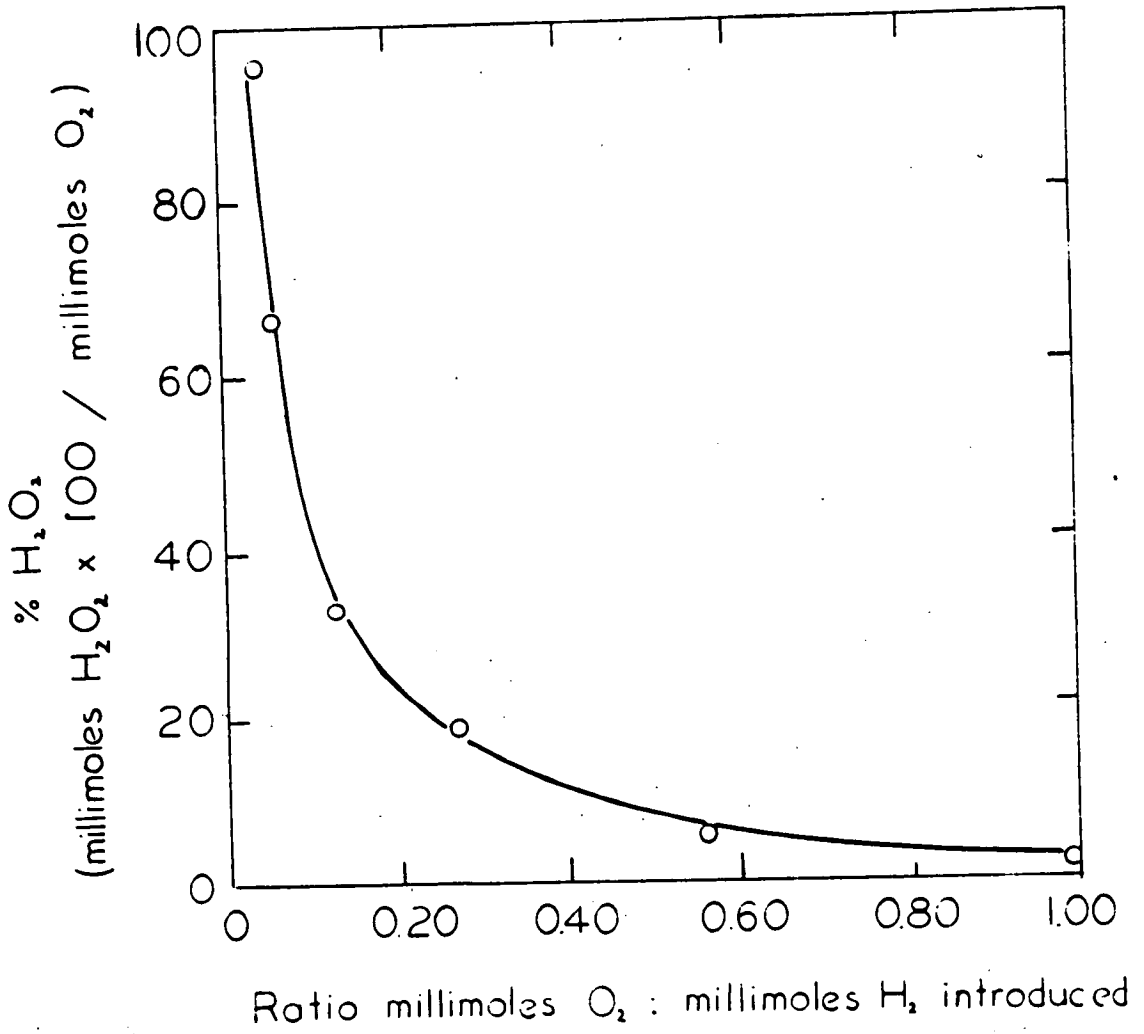


FIGURE II REACTION OF ATOMIC HYDROGEN WITH MOLECULAR OXYGEN. VARIATION OF H_2O_2 YIELD WITH REACTANT COMPOSITION

(Partial pressure H_2 0.24 mm., 20.9 c.c./min. H_2 at S.T.P., TEMPERATURE -196°C)

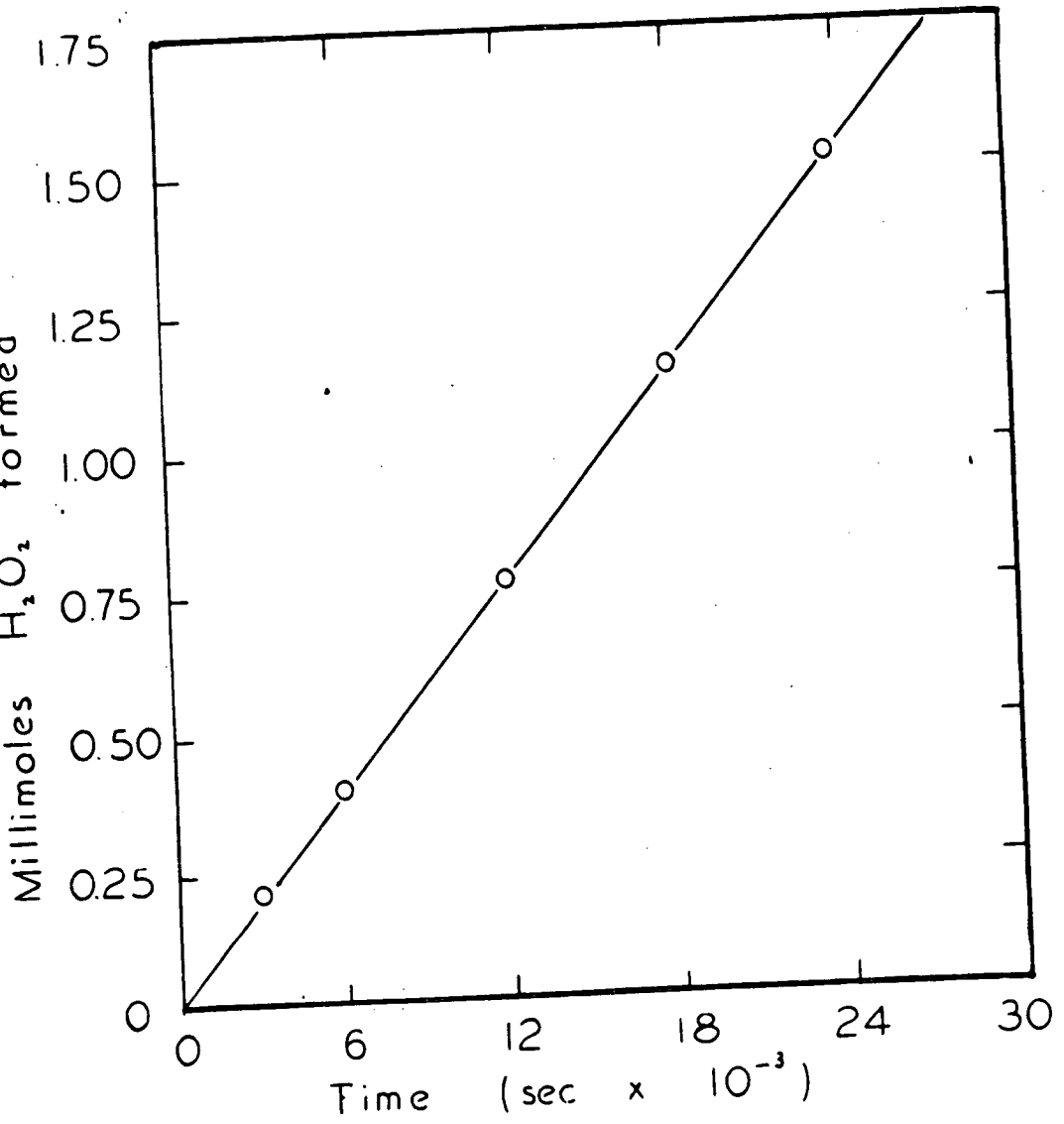
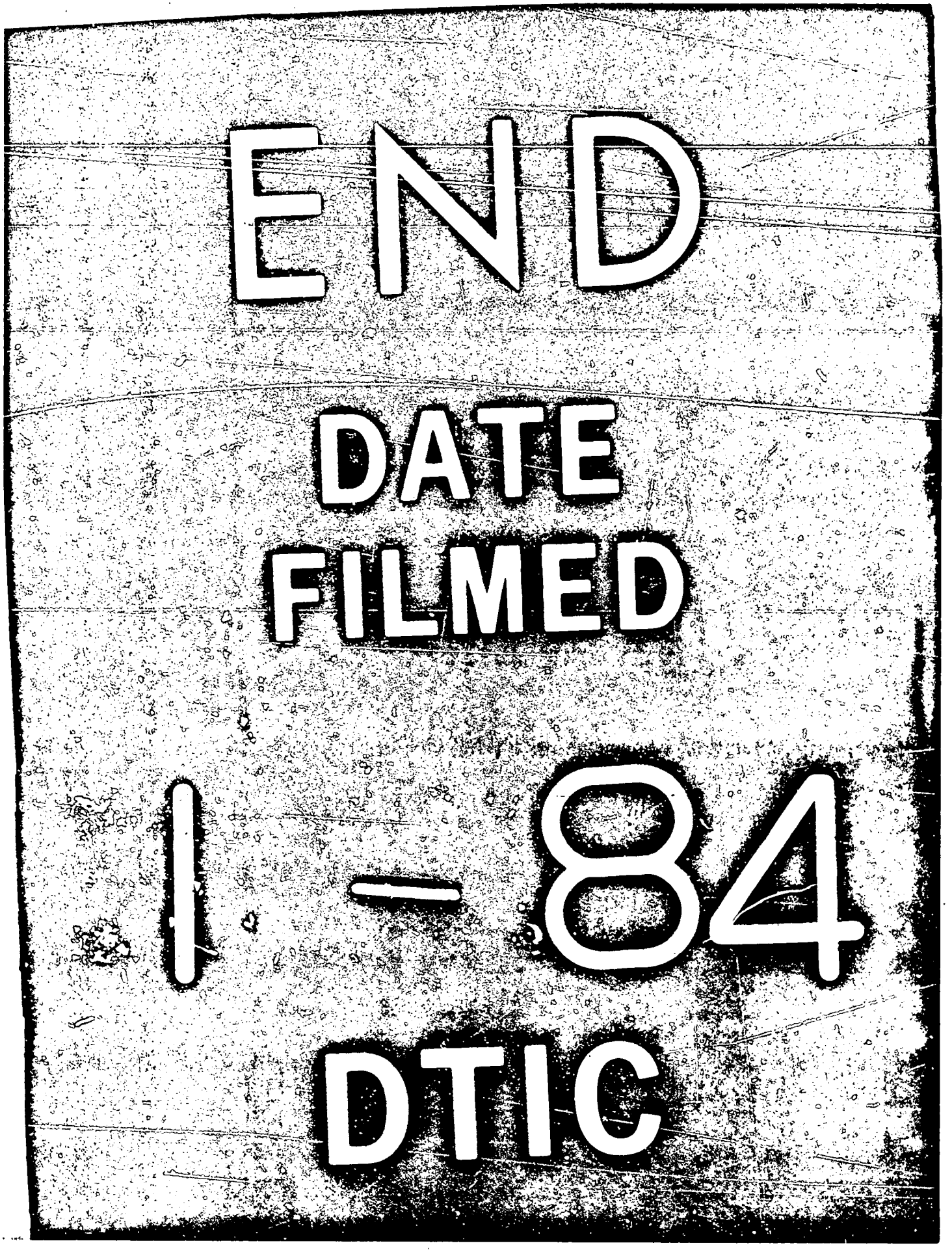


FIGURE III FORMATION OF H_2O_2 FROM ATOMIC HYDROGEN AND OXYGEN (partial pressure H_2, 0.24 mm.; temperature, -196° C)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SEMI-ANNUAL REPORT JULY 1947

Contract NOrd-7920

Task PRN-7

DEPARTMENT OF CHEMISTRY
PRINCETON UNIVERSITY

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SEMI-ANNUAL REPORT - JULY, 1947

Contract NOrd-7920, Task PRN-3

Department of Chemistry,

Princeton University

Princeton, N.J.

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This Task was formally assigned to Princeton University as an Associated Contractor of the Applied Physics Laboratory, Johns Hopkins University, by letter dated June 19, 1945, from A. F. Hussey, Jr., Rear Admiral U.S.N. Chief of Bureau of Ordnance; E. N. Parker, Captain, U.S. N., by direction, in the following terms-

"Research and development work is to be carried on in connection with rocket launched, jet-propelled, guided, anti-aircraft missiles related to Task F (Bumblebee) assigned to the Applied Physics Laboratory, The Johns Hopkins University, by the Bureau of Ordnance, with special emphasis on combustion of fuels and fundamental research of chemical principles governing the operation of such devices. This work shall include experimentation and testing of such fuels and principles, and design and fabrication of supplementary equipment used in carrying out this work. It shall also include cooperation through consultation and otherwise, as may be practicable, with other agencies concerned with the development or use of devices and techniques related to this Task PRN-3."

The above has been supplemented by Problem Statement PRN-3-A as follows-

PRN-3-A - Combustion Principles

By the assignment of this problem under the scope of Task PRN-3 of Contract NOrd-7920, Princeton University is directed to do the following work in accordance with the provisions of said contract:

Conduct basic research on physico-chemical principles involved in the combustion of fuels, including specifically the following:

A. Flame Propagation.

Make experimental and theoretical studies of flame speeds for laminar flow to a bunsen cone as a function of composition, pressure, temperature, flow velocity, tube diameter, and Reynold's number; study the relation to calculated equilibrium atom and radical concentrations; make use of

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THE HIGH FREQUENCY OSCILLATOR AS A FLAME DETECTOR

By

Hartwell F. Calcote

(Transmitted by Robert N. Pease)

Department of Chemistry, Princeton University

Contract NOrd-7920, Task PRN-3

Technical Paper No. 26

March 25, 1947

SUMMARY

A new method of detecting ionization in flames utilizing the loading characteristics of a high frequency oscillator is described for use in the measurement of flame speeds. As the flame passes through an oscillator tank coil which is constructed around a combustion tube, the absorption of energy due to ion formation and increased eddy-current losses in the gas causes an increase in the plate current of the oscillator which is used to trigger an electronic chronoscope. Two distinct advantages of the method are: (1) direct measurement of flame speeds can be made without the introduction of electrodes or screen wires into the tube, and (2) the point in the tube at which the measurement is made can be varied at will.

spectroscopic, photographic and sampling techniques; study the transition from laminar to turbulent flow, especially at low pressures.

B. Reaction Kinetics.

Make experimental and theoretical studies of the kinetics of oxidation reactions, including the oxidation of diborane, hydrazine, and related substances; study the spontaneous ignition of fuels using addition agents.

Beginning April 1, 1947, the expenses of this project have been divided equally between Contract NOrd-7920, Task PRN-3, and Contract N6-ori-105, Task III, Phase 2. (Letters: Office of Naval Research 17 January, 1947, File EXOS:ONR:251, Serial No. 9707; and Bureau of Ordnance 14 February, 1947, File: NOrd-7920, Re9d-AKC/gep). From January 1, 1947, to June 30, 1947, the amount charged to Contract NOrd-7920, Task PRN-3, was $13, 701.21.

Authorization to treat the subject matter as unclassified has also been received (Letter: Bureau of Ordnance, 21 April, 1947, File NOrd-7920-Re9d-AKC/gep).

SUMMARY OF TECHNICAL PAPERS

Experimental work undertaken in the past six months is partially summarized in six Technical Papers, copies of which are appended.

Two of these papers (nos. 26 and 30) deal with methods of flame detection and flame speed measurement in glass tubes without the use of internal probes or electrodes which might interfere with the flame itself. In one application the loading characteristics of a high-frequency oscillator tank coil are altered as the flame passes - due presumably to increased eddy current losses in the ionized gas. In the other case, two narrow aluminum bands around the explosion tube are connected through a high resistance to a source of e.m.f. Passage of the flame alters the resistance of the circuit producing a voltage pulse which triggers an electronic timing circuit.

The broadening of low-pressure ignition limits of n-butane in air or oxygen as temperature is raised reveals some interesting results (Paper No. 28). With oxygen the only effect is to halve the lean limit between 25° and 300° C. The low-pressure limit remains fixed at about 25 mm. (Spark ignition is one inch glass tube; downward propagation). With air, on the other hand, the lean limit is only moderately reduced, but the lower pressure limit falls from about 100 to 50 mms.

In the field of spontaneously ignitable compounds, it is

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JAN 31 1951

Annual Report - January, 1951

Contract NOrd - 7920 Task PRN-3

Department of Chemistry

Princeton University

Princeton, N. J.

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Annual Report - January, 1951

Contract NOrd - 7920 Task PRN-3

Department of Chemistry

Princeton University

Princeton, N. J.

(Transmitted by Robert N. Pease)

Under Joint Sponsorship of:

Project Bumblebee, Applied Physics Laboratory,

Johns Hopkins University.

Bureau of Ordnance, Navy Dept.

Contract NOrd-7920. Task PRN-3

and

Project Squid, Princeton University.

Office of Naval Research and Office of Air Research

Contract N6-ori-105, Task Order III, Phase 2.

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Beginning April 1, 1947, the expenses of this project have been divided equally between Contract NOrd-7920, Task PRN-3, and Contract N6-ori-105, Task III, Phase 2. (Letters: Office of Naval Research 17 January, 1947, File EXOS:ONR:251, Serial No. 9707; and Bureau of Ordnance 14 February, 1947, File: NOrd-7920, Re9d-AKC/gep). From January 1, 1949 to December 31, 1949, the amount charged to Contract NOrd-7920 Task PRN-3, was $16,330.82.

Authorization to treat the subject matter as unclassified has also been received (Letter: Bureau of Ordnance, 21 April, 1947, File NOrd-7920-Re9d-AKC/gep).

Since January 1950, the following Technical Papers have been submitted-

No. 48. The Effect of Traces of Oxygen on the Reaction of Aluminum Borohydride with Ethylene.
by Richard S. Brokaw

No. 49. The Kinetics of the Thermal Decomposition of Diborane, with a Review of Structure Data.
by Richard P. Clarke.

The following articles based on project research have been published-

Kinetics of the Non-catalytic Oxidation of Ammonia: Flow Experiments.
by Edgar R. Stephens and Robert N. Pease
(J.Am.Chem.Soc. 72, 1188 (1950))

The Low Temperature, Low Pressure, Hydrogen Atom Initiated Combustion of Hydrocarbons.
by Elmer J. Badin
(J.Am.Chem.Soc. 72, 1550 (1950))

The Oxidation of Butene-1 Induced by Aluminum Borohydride.
by Richard S. Brokaw, Elmer J. Badin and Robert N. Pease (J.Am.Chem.Soc. 72, 1793 (1950))

The Kinetics of the Reaction of Aluminum Borohydride Vapor with Olefins.
by Richard S. Brokaw and Robert N. Pease
(J.Am.Chem.Soc. 72, 3237 (1950))

The Effect of Traces of Oxygen on the Reaction of Aluminum Borohydride with Ethylene.
by Richard S. Brokaw and Robert N. Pease
(J.Am.Chem.Soc. 72, 5263 (1950))

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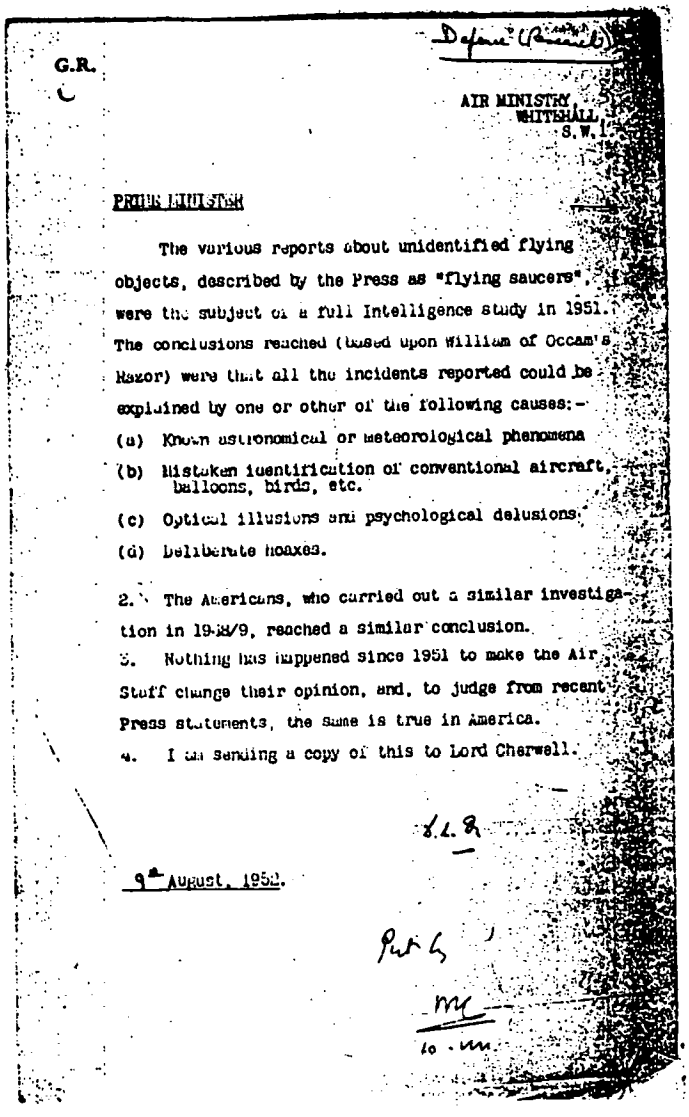

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PRIME MINISTER

The various reports about unidentified flying objects, described by the Press as "flying saucers", were the subject of a full Intelligence study in 1951. The conclusions reached (based upon William of Occam's Razor) were that all the incidents reported could be explained by one or other of the following causes:-

(a) Known astronomical or meteorological phenomena

(b) Mistaken identification of conventional aircraft, balloons, birds, etc.

(c) Optical illusions and psychological delusions.

(d) Deliberate hoaxes.

2. The Americans, who carried out a similar investigation in 1948/9, reached a similar conclusion.

3. Nothing has happened since 1951 to make the Air Staff change their opinion, and, to judge from recent Press statements, the same is true in America.

4. I am sending a copy of this to Lord Cherwell.

9th August, 1952.

The Air Minister's response, revealing his ignorance of American findings (*Crown Copyright*)

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A 1/41 Sep. 19

Following unusual incident observed R.A.F. Topcliffe by number officers and airmen aircrew 191053 local time. Meteor aircraft observed at approx. 500 feet and descending. White object was seen 5 miles astern at approx. 15000 feet and moving at comparatively slow speed on similar course. Object was silver in colour and circular. It maintained slow forward speed before commencing descent. Swinging in pendular motion like a falling sycamore leaf. Thought by observers to be parachute or cowling from Meteor aircraft. Aircraft had turned towards Dishforth and object. Whilst still descending, appeared to follow suit. Pendulous motion and descent ceased and object began rotary [illegible] about its own axis. Suddenly accelerated at an incredible speed [illegible]terly direction but turning to a S.E. course. Observers stated that its movements were not identifiable with anything they had seen in the air and acceleration was in excess of that of a shooting star. Duration of incident 1 5/20 seconds.

Copies to:- Time of origin 191644 Z

A.I.3.(B) (ACTION)

Recirculated Registry Telegrams 22/9/52.
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C.A.S.
S. OF S.
D.M.O.
M. OF DEFENCE FOR D.S.I. (2 c[illegible])

An Air Ministry report giving details of the sighting by personnel at RAF Topcliffe, Yorkshire, in September 1952 (*Crown Copyright*)

BROADLANDS ARCHIVES

The attached statement was dictated by Mr. Briggs to Mrs. Travis on the morning of the 23rd February 1955 at my request.

My own electrician, Heath, reported his conversation and I subsequently interviewed Mr. Briggs, with my wife and younger daughter, and as a result of his account, Heath and I accompanied him to the place from which he saw the Flying Saucer.

We followed the marks of his bicycle in the snow very easily, and exactly at the spot which he described the tracks came to an end, and foot marks appeared beside it. Next to the foot marks there were the marks of a body having fallen in the snow, and then the marks of a bicycle having been picked up again, there being a clear gap of 3ft. between where the front wheel marks originally ended and then started again. The rear wheel marks were continuous but blurred. From then on the bicycle tracks led back to the drive.

The bicycle tracks absolutely confirm Mr. Briggs' story, so far as his own movements are concerned.

He, Heath and I searched the area over the spot where the Flying Saucer was estimated to have been, but candidly we could see no unusual signs.

The snow at the bottom of the meadow had melted much more than that at the top, and it would have been difficult to see any marks.

This statement has been dictated in the presence of Heath and Mr. Briggs, and Heath and I have carefully read Mr. Briggs' statement, and we both attest that this is the exact story which he told us.

Mr. Briggs was still dazed when I first saw him, and was worried that no one would believe his story. Indeed, he made a point of saying that he had never believed in Flying Saucer stories before, and had been absolutely amazed at what he had seen.

He did not give me the impression of being the sort of man who would be subject to hallucinations, or would in any way invent such a story. I am sure from the sincere way he gave his account that he, himself, is completely convinced of the truth of his own statement.

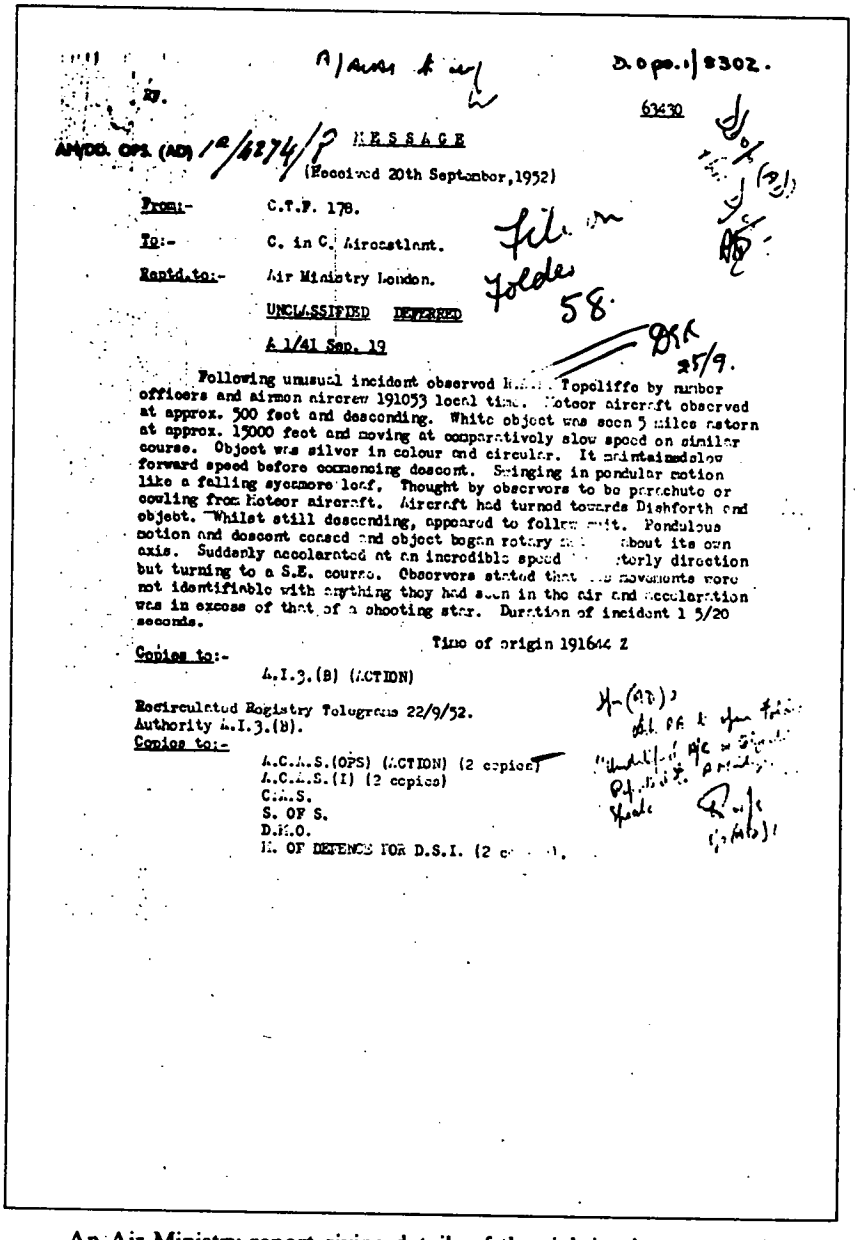
He has offered to swear to the truth of this statement on oath on the Bible if needed, but I saw no point in asking him to do this.

Mountbatten of Burma

I confirm that I have read and agree with the above statement.

R.K. Heath

Statement by Lord Mountbatten relating to the reported landing of a UFO at his estate in 1955 (*Broadlands Archives*)



D.Ops.1/8302.

63430

AM/DD. OPS. (AD) 1a/4274/52 MESSAGE

(Received 20th September, 1952)

From:- C.T.F. 178.

To:- C. in C. Aircastlant.

Rptd.to:- Air Ministry London.

UNCLASSIFIED DEFERRED

A 1/41 Sep. 19

Following unusual incident observed [illegible] Topcliffe by number officers and airmen aircrew 191053 local time. Meteor aircraft observed at approx. 500 feet and descending. White object was seen 5 miles astern at approx. 15000 feet and moving at comparatively slow speed on similar course. Object was silver in colour and circular. It maintained slow forward speed before commencing descent. Swinging in pendular motion like a falling sycamore leaf. Thought by observers to be parachute or cowling from Meteor aircraft. Aircraft had turned towards Dishforth and object. Whilst still descending, appeared to follow suit. Pendulous motion and descent ceased and object began rotary [illegible] about its own axis. Suddenly accelerated at an incredible speed [illegible] storly direction but turning to a S.E. course. Observers stated that [illegible] movements were not identifiable with anything they had seen in the air and acceleration was in excess of that of a shooting star. Duration of incident 1 5/20 seconds.

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An Air Ministry report giving details of the sighting by personnel at RAF Topcliffe, Yorkshire, in September 1952 (*Crown Copyright*)

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NOT ONE WORD HAS BEEN OMITTED.

RLI: VLM 6.0
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TO THE TEAM

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THE MAN WHO NEVER WAS

by EWEN MONTAGU

With a foreword by
LORD ISMAY, G.C.B., C.H., D.S.O.

BANTAM PATHFINDER EDITIONS
TORONTO/NEW YORK/LONDON

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we had explained that someone had torn the stubs off the centre pair "as a joke"—we did not tell him that the joke was on the Germans.

After the theatre we went on to the Gargoyle Club for dinner. There we were shown to one of the side tables which had a banquette faced by two chairs. I suggested that the two girls should take the more comfortable banquette, but Jill turned to George and said, "Considering Bill and Pam are engaged, they are the least affectionate couple I know. They don't even want to sit together at his farewell party before he goes abroad." At this the couple at the next table looked round and pricked up their ears.

I "explained" to Jill that even if Pam and I were engaged we had only known one another for a few days (obvious disapproval of war weddings registered at the next table), and then added, as an afterthought, that it would be different when Pam and I knew one another better, for my boss had said (in the letter that she had seen[1]) that, although I was quiet and shy at first, I really did know my stuff. At this the couple at the next table registered even stronger disapproval and got up and danced.

I might interpolate another result of this joking identification of Bill Martin with me. Pam followed it up by giving me a larger copy of the photograph that was on its way to Spain in Bill Martin's wallet, and signed it "Till death do us part. Your loving Pam"—a safe inscription, as "I" was already "dead." At that time I was staying with my mother, and to see her reaction I put the photograph on my dressing table. I was disappointed—she said nothing. About a year later, when my wife returned from America, where she had been doing a job in our Security Co-ordination Service, I showed her the photograph, and she astonished me by saying, "So *that* was why your

[1] Lord Louis Mountbatten's letter to Admiral Cunningham.

mother started writing in her letters that I should come home as soon as my [illegible] it"!

While we were waiting in London, the *Seraph* was having an uneventful passage to the coast of Spain. The first news that we got was from the pre-arranged signal which informed us, on the 30th April, that "Operation Mincemeat" had been completed. This was followed by a letter sent by Lieutenant Jewell from Gibraltar:

Most Secret and Personal

From: The Commanding Officer, H.M. Submarine *Seraph.*
Date: 30th April, 1943.
To Director of Naval Intelligence.
Copy to F.O.S.
(for Lt.-Cdr. The Hon. E. E. S. Montagu, R.N.V.R.) personal.

Operation Mincemeat

Weather: The wind was variable altering between S.W. and S.E., force 2. It was expected that the sea breeze would spring up in the morning, close inshore, as it had on the previous morning in similar conditions.

Sea and swell—2:0—Sky overcast with very low clouds—visibility was patchy, 1 to 2 miles—Barometer 1016.

2. *Fishing Boats:* A large number of small fishing boats were working in the bay. The closest was left, about a mile off, and it is not thought that the submarine was observed by them.

3. *Operation:* The time of 0430 was chosen as being the nearest to Low Water Lisbon (0731), which would allow the submarine to be well clear by dawn. The canister was opened at 0415 and the body extracted. The blanket was opened up and the body examined. The brief case was found to be securely attached. . . . The "Mae West" was blown up very hard and no further air was needed. The body was placed in the water at 0430 in a position 148° Portil Pillar 1.3 miles approximately eight cables from the beach and started to drift inshore. This was

cribbling nonsense to you again. Your letter rning just as I was dashing out—madly late as lo write such heavenly ones. But what are these horrible dark hints you're throwing out about being sent off somewhere—*of course* I won't say a word to anyone—I never do when you tell me things, but it's not abroad is it? Because I won't have it, I WON'T, tell them so from me. Darling, why did we go and meet in the middle of a war, such a silly thing for anybody to do—if it weren't for the war we might have been nearly married by now, going round together choosing curtains etc. And I wouldn't be sitting in a dreary Government office typing idiotic minutes all day long—I *know* the futile sort of work I do doesn't make the war one minute shorter—

Dearest Bill, I'm so thrilled with my ring—scandalously extravagant—you know how I adore diamonds—I simply can't stop looking at it.

I'm going to a rather dreary dance tonight with Jock & Hazel, I think they've got some other man coming. You know what their friends always turn out to be like, he'll have the sweetest little Adam's apple & the shiniest bald head! How beastly & ungrateful of me, but it isn't really that—you know—don't you?

Look darling, I've got next Sunday & Monday off for Easter. I shall go home for it of course, *do* come too if you possibly can, or even if you can't get away from London I'll dash up and we'll have an evening of gaiety—(By the way Aunt Marian said to bring you to dinner next time I was up, but I think that might wait?)

Here comes the Bloodhound, masses of love & a kiss

from

PAM.

We felt that we had been well served, and that the letters were ideal for our purpose.

To take the part of Major Martin's father we chose a young wartime officer who produced a brilliant tour de force; the letter of the 13th April and the enclosure seemed to me to be so redolent of Edwardian pomposity that no one *could* have invented them—no one but a father of the old school could

have written them. The letter and its enclosure read:

Tel. No. 98.

Black Lion Hotel,
Mold,
N. Wales.
13*th April*, 1943.

MY DEAR WILLIAM,

I cannot say that this Hotel is any longer as comfortable as I remember it to have been in pre war days. I am, however, staying here as the only alternative to imposing myself once more upon your aunt whose depleted staff & strict regard for fuel economy (which I agree to be necessary in war time) has made the house almost uninhabitable to a guest, at least one of my age. I propose to be in Town for the nights of the 20th & 21st of April when no doubt we shall have an opportunity to meet. I enclose the copy of a letter which I have written to Gwatkin of McKenna's about your affairs. You will see that I have asked him to lunch with me at the Carlton Grill (which I understand still to be open) at a quarter to one on Wednesday the 21st. I should be glad if you would make it possible to join us. We shall not however wait luncheon for you, so I trust that, if you are able to come, you will make a point of being punctual.

Your cousin Priscilla has asked to be remembered to you. She has grown into a sensible girl though I cannot say that her work for the Land Army has done much to improve her looks. In that respect I am afraid that she will take after her father's side of the family.

Your affectionate

FATHER.

Copy
Tel. No. 98.

Black Lion Hotel,
Mold,
N. Wales.
10*th April.*

MY DEAR GWATKIN,

I have considered your recent letter concerning the Settlement which I intend to make on the occasion of Wil-

a "lead in" to the Head Office, it was decided that: I did not think that the Germans would have had the experience that we had had of overdrafts and, after all, even if the amount was small, Major Martin's father was clearly a man of some importance. This letter was drafted for us personally by Mr. Whitley Jones, the Joint General Manager of Lloyds Bank, typed in his office and signed by him. It read as follows:

Lloyds Bank Limited
Head Office
London, E.C.3.

Private 14th April, 1943.

Major W. Martin, R.M.,

Army and Navy Club,
Pall Mall,
London, S.W.1.

DEAR SIR,

I am given to understand that in spite of repeated application your overdraft amounting to £79. 19*s*. 2*d*. still outstands.

In the circumstances, I am now writing to inform you that unless this amount, plus interest at 4% to date of payment, is received forthwith we shall have no alternative but to take the necessary steps to protect our interests.

Yours faithfully,
(*Signed*) E. WHITLEY JONES,
Joint General Manager.

It had been arranged that this letter from the bank should be sent through the post to Major Martin at the Naval and Military Club, but it was erroneously posted addressed to him at the Army and Navy Club, Pall Mall; there the Hall Porter marked the envelope "Not known at this address" and added "Try Naval and Military Club, 94 Piccadilly." This seemed to us to be a most convincing indication that the letter

was real and not specially prepared, so we decided that Major Martin should keep this letter in its envelope.

One of us had got the co-operation of the Naval and Military Club; we had been given a bill dated the 24th April which showed that Major Martin had been a temporary member of that club and had stayed there for the nights of the 18th to 23rd April inclusive; apart from its other purpose of general build-up of the Major's personality, it afforded a strong indication that he was still in London on the 24th.

Similarly, there was but little difficulty in getting the bill for the engagement ring. I chose S. J. Phillips, the Bond Street jewellers, as I knew that they had an international trade, so that it was probable that there would be bill-heads of theirs available in Germany to prove, if comparison were to be made, how genuine Major Martin's bill was. That bill was dated the 19th April, but showed that the ring had actually been bought on the 15th.

We were in some difficulty in getting these and the other documents. Obviously, the true story of why we wanted them could not be told, but I was convinced that just to ask for them and to give no reason, except that it was for something secret, was liable to cause talk; on the other hand, once a plausible reason was given we felt sure that we could rely on those whom we approached.

So my "cover story" was that there was someone who seemed suspiciously interested in officers who were temporarily hard up: we wanted to have some documents, building up towards a shortage of money, which a particular person could leave about his rooms where they would be seen by this individual. We could then observe what his conduct was. This seemed to be a satisfying story, and we re-

mander-in-Chief, Mediterranean. It was as follows:

In reply quote: S.R. 1924/43
Combined Operations Headquarters,
1A Richmond Terrace,
Whitehall, S.W.1.
21st April, 1943.

DEAR ADMIRAL OF THE FLEET,

I promised V.C.I.G.S. that Major Martin would arrange with you for the onward transmission of a letter he has with him for General Alexander. It is very urgent and very "hot" and as there are some remarks in it that could not be seen by others in the War Office, it could not go by signal. I feel sure that you will see that it goes on safely and without delay.

I think you will find Martin the man you want. He is quiet and shy at first, but he really knows his stuff. He was more accurate than some of us about the probable run of events at Dieppe and he has been well in on the experiments with the latest barges and equipment which took place up in Scotland.

Let me have him back, please, as soon as the assault is over. He might bring some sardines with him—they are "on points" here!

Yours sincerely,
LOUIS MOUNTBATTEN.

Admiral of the Fleet Sir A. B. Cunningham,
G.C.B., D.S.O.,
Commander in Chief Mediterranean,
Allied Force H.Q.,
Algiers.

I was rather pleased with that letter. It explained why Major Martin had the "vital letter" and why that had not been sent through official channels. It explained why Major Martin was being flown out. And, in view of the Prime Minister's clear realisation that it would not matter if Sicily was pinpointed by

a failure of our operation, I was en
a reference to Sardinia; I did this by
was frightfully laboured, but I thoug
sort of joke would appeal to the Germans
be able to see the point and understa... the reference. This joke, with its indication of Sardinia, was destined to play a part in our eventual success.

But there was yet one more ruse concealed in it. I was sure that the Germans in Berlin would get the "vital letter" or at least a copy of it, but I could not be sure that they would get more than a précis of what might be called the supporting documents, and I wanted to make certain that they would get this letter in full. I wanted Berlin to have the joke about Sardinia and I wanted them to have the explanation of why this officer was flying out and was carrying the unusual "vital document"; so I put in the bit about Dieppe. I was sure that no German could resist passing on to his superiors what he would feel to be an admission by the Chief of Combined Operations that our raid on Dieppe was not the success that we had hoped it would be. Whether or not I had accurately penetrated the German mind, this was the only one of Major Martin's documents, in addition to the vital document, of which we found a complete copy in the German files and which we know was studied in full by the German Intelligence in Berlin.

The letter was duly typed at Combined Operations H.Q. signed by Lord Louis, and given a fictitious, but plausible, reference number.

In the end we gave Major Martin one more letter to carry in addition to his personal papers. We were a little worried by the fact that an officer would probably put two normal-sized envelopes into his pocket, or perhaps into his personal kit in spite of the secrecy of one of them. If Major Martin were to do this we had no absolute guarantee that the Span-

wholly unconvincing; it was the sort of straightforward letter which could and would go in an official bag and would never be given to an officer to carry in his pocket. This was a challenge to which Sir Archibald rose wonderfully, and he produced a truly magnificent letter. To help the deception, in case the Germans heard of "Husky" (the real code name for the invasion of Sicily), he used that as the code name for the eastern operation against Greece, and used "Brimstone," a fake code name, for the western operation against Sardinia. His draft ran as follows:

Telephone: Whitehall 9400.
Chief of the Imperial
General Staff.

War Office,
Whitehall,
London, S.W.1.
23rd April, 1943.

Personal and Most Secret

My dear Alex,

I am taking advantage of sending you a personal letter by hand of one of Mountbatten's officers, to give you the inside history of our recent exchange of cables about Mediterranean operations and their attendant cover plans. You may have felt our decisions were somewhat arbitrary, but I can assure you in fact that the C.O.S. Committee[1] gave the most careful consideration both to your recommendation and also to Jumbo's.[2]

We have had recent information that the Boche have been reinforcing and strengthening their defences in Greece and Crete and C.I.G.S. felt that our forces for the assault were insufficient. It was agreed by the Chiefs of Staff that the 5th Division should be reinforced by one Brigade Group for the assault on the beach south of Cape Arakos and that a similar reinforcement should be made

1 Chiefs of Staff Committee.

2 Nickname of Field-Marshal Sir Henry Wilson, Commander-in-Chief, Middle East.

for the 56th Division at Kalamata. We are earmarking the necessary forces and shipping.

Jumbo Wilson had proposed to select Sicily as cover target for "Husky"; but we have already chosen it as cover for operation "Brimstone." The C.O.S. Committee went into the whole question exhaustively again and came to the conclusion that in view of the preparations in Algeria, the amphibious training which will be taking place on the Tunisian coast and the heavy air bombardment which will be put down to neutralise the Sicilian airfields, we should stick to our plan of making it cover for "Brimstone"—indeed, we stand a very good chance of making him think we will go for Sicily—it is an obvious objective and one about which he must be nervous. On the other hand, they felt there wasn't much hope of persuading the Boche that the extensive preparations in the eastern Mediterranean were also directed at Sicily. For this reason they have told Wilson his cover plan should be something nearer the spot, e.g. the Dodecanese. Since our relations with Turkey are now so obviously closer the Italians must be pretty apprehensive about these islands.

I imagine you will agree with these arguments. I know you will have your hands more than full at the moment and you haven't much chance of discussing future operations with Eisenhower. But if by any chance you do want to support Wilson's proposal, I hope you will let us know soon, because we can't delay much longer.

I am very sorry we weren't able to meet your wishes about the new commander of the Guards Brigade. Your own nominee was down with a bad attack of 'flu and not likely to be really fit for another few weeks. No doubt, however, you know Forster personally; he has done extremely well in command of a brigade at home, and is, I think, the best fellow available.

You must be about as fed up as we are with the whole question of war medals and 'Purple Hearts.' We all agree with you that we don't want to offend our American friends, but there is a good deal more to it than that. If our troops who happen to be serving in one particular theatre are to get extra decorations merely because the Americans happen to be serving there too, we will be faced with a good deal of discontent among those troops fighting else-

...eat." I was, I confess, a little dubious whether it would work; but I put it up to the Chiefs of Staff, who approved it in principle. Thereafter, Lieut.-Commander Montagu, who originated the idea, and his colleagues went full steam ahead.

The operation succeeded beyond our wildest dreams. To have spread-eagled the German defensive effort right across Europe, even to the extent of sending German vessels away from Sicily itself, was a remarkable achievement. Those who landed in Sicily, as well as their families, have cause to be especially grateful.

It is not often that the whole story of a secret operation can be made public, told by someone who knows every detail. The military student can be grateful that chance has made it possible for him to have a text-book example of a very specialised branch of the art of war: others will enjoy a "real-life thriller" —which once more illustrates that truth is stranger than fiction.

Paris.
7th June, 1953.

Author's Note

THIS is a true account of an Operation carried out in the years 1942-1943. Such facts as are not within my own personal knowledge are derived from contemporary documents and reports, and are neither based on anyone's recollection of what happened ten years ago nor on anyone's attempts to justify his actions or those of his associates.

I naturally could not speak or write about it until a fictional story partially based on this operation, and references in German memoirs to the receipt of the documents which formed the basis of this deception, made it clear that it would no longer be possible to maintain that secrecy which all of us who took part in the operation had preserved. This fact was recognised by the authorities, who doubtless appreciated the possible dangers and disadvantages which might result from publication by partially informed writers, and I was given official permission to publish the full story.

The operation was carried out by a team who must, unfortunately, remain anonymous as some of them are still in Government service, therefore I have substituted a false Christian name for "George's" real one; I have also, of course, maintained the secrecy of "Major Martin's" identity. Where I have referred to other persons I have used the titles and ranks that they held at the time of the operation.

If anyone studies this story, some good may re-

Eindhoven would insure the necessary support for my group without the need for me to be there.

At the Philips Works we were able to make quite acceptable arrangements for the investigating scientists. Nutting tried once more to assert himself and keep us out. Again he was cut short. It developed later that he was after some specific components of equipment produced at the plant and wanted to prowl without interference.

This was the first time our scientists had been in an active combat zone. They wore military uniform without insignia. However, the combat men saw nothing strange about them. It was reassuring to see how well the scientists fitted in. Their behavior belied their oft-expressed philosophy that they were not soldiers and should not be expected to act as such. Under fire and in the face of enemy threat, their conduct could not have been criticized by the severest field commander.

By the time all the scientists and technical experts of the various intelligence arms were assembled, Colonel Strangeways had more than 400 men on his hands. Our small operational group left Eindhoven knowing that those were good and dependable hands, and our scientific contingent was well set up to exploit the information at the huge Philips Works.

Meanwhile we had turned up the destination of three of the uranium-laden freight cars sent into France ahead of the Nazi invader of 1940. The three had been ticketed for Toulouse. As we pointed the jeeps toward Paris, I carried in my pocket a letter from H. Lecoin, Director of the Commercial Department of Societe Generale Metallurgique de Hoboken, to Andre Polette, an engineer with the Mineralais et Metaux firm. In translation, the letter read:

Hoboken, 23 September, 1944
Les Anvers

Societe Generale
Metallurgique de Hoboken
Societe Anonyme
Directorate

Dear Mr. Polette:

The bearers of this letter, Colonel Pash, or Major Furman of the American Army, are presently engaged in searching for our uranium.

We would appreciate it if you will provide them with information which you may formerly have obtained concerning the three railroad cars which were delivered to the Toulouse Arsenal, and assist them in ultimately locating the others of which we have no information.

We wish to thank you in advance for your kindness.

Looking forward to the pleasure of hearing from you, we remain, dear Mr. Polette,

Sincerely yours,
H. Lecoin

Much later I was told that the Oolen shipment and the subsequent shipment of materials found in France were to be dropped on Hiroshima—in somewhat altered form, to be sure. But as we headed south that day, the uranium in France had still to be found.

NR. 1478 DI PROT.

IL CAPO DEL GOVERNO

23 DICEMBRE 1943

A TUTTE LE AUTORITA' CIVILI E MILITARI

IL TEN. COL. B.T. PASH DELL'ESERCITO AMERICANO È CAPO DI UNA MISSIONE SPECIALE AMERICANA INCARICATA DI RACCOGLIERE INFORMAZIONI DI CARATTERE MILITARE RELATIVE AL PROGRESSO RAGGIUNTO DAL NEMICO NEL CAMPO DELLO SVILUPPO SCIENTIFICO.

TUTTE LE AUTORITÀ ITALIANE VORRANNO DARE LA MASSIMA COLLABORAZIONE A DETTO UFFICIALE ED AI MEMBRI DELLA MISSIONE STESSA.-

IL CAPO DEL GOVERNO

The party took place in the two large, gaily decorated social rooms of the CIC headquarters building. The hosts and many guests, including Margaret Bourke-White of *Life* Magazine, were in high spirits. A record player furnished music for dancing. Major Pappert, the detachment commander, told me he was assigning to Alsos one of his best combat-tested agents, Carl Fiebig of Sebewing, Michigan. Carl proved a pleasant, steady boy, cool and efficient under fire, and an excellent German linguist. After I had explained something of the operational side of our mission, Carl said, "Colonel, my

buddy, Gerry Beatson, from Rockford, Illinois, is a fighting fool of a CIC agent. I know he'd like to join us."

It seems Gerry "happened" also to be at the party, having come up from Sorento where he was stationed. I suspected that Carl had arranged for Gerry to be around in the hope that he would be able to meet me. Gerry looked like a kid. But he showed more assurance and poise than most agents. He was decisive, quick, and wore an expressive grin. I decided to take him on. His concern was whether he would fit in. He had neither language background nor technical training.

"Colonel, all my experience has been with the 'doggies' in the combat zone," he said. "What could I do in your outfit?"

"Well, Gerry, we expect to operate right up with the infantry and will need men with your experience. You could be my trigger man."

The fourth agent to join us was Perry Bailey, a tall, blond, pleasant-looking chap whose easy manner and soft disposition belied his efficiency and capabilities. He was typical of our agents. He had no special background for this kind of work, but he was an alert, resourceful and energetic American boy—a fine product of our education and our way of life.

These four lads were to play important roles in the operation of Alsos, sharing with me anxious and dangerous days. Each was to contribute vitally to the success of our mission.

During the preliminary phase Ralph Cerame located scientists for our group to contact and, as a technical translator, assisted in discussions with them. While maintaining surveillance on certain scientists—especially Dr. Bakunina, a Russian-born faculty member of the University of Naples—he had more than his share of home-made Italian spaghetti. However, our activities were not confined to the rear areas. Some reports were received from forward combat elements indicating possible new developments in enemy armament. Each time, one of our scientists would be conducted to the reporting unit to investigate. On one such occasion Dr. Johnson was heading for the 36th Field Artillery Brigade CP (command post). The road led in front of our 105mm emplacements. Suddenly the guns opened up against Monte Cassino, sending the heavy shells whizzing over the heads of those in the jeep.

"One can't help wanting to duck," remarked Dr. Johnson after the second salvo.

During such trips we became accustomed to certain signs

learn when I contacted Naval Command that the OSS had used Naval craft to take visiting Washington brass on "operational tours" to the Italian coast—visiting VIP's frequently liked "to get the feel of being under fire." I was told that on one such joy-ride they drew within range of German coastal guns. A couple of PT boats were shot up and some crew members were hit. Our Navy was furious and quit lending boats to the OSS. The only way my problem could be resolved was from the top down. This meant a trip to Algiers. In turn, that would affect our proposed Anzio operation scheduled for Tuesday, 8 February. Still, I could not wait. The only Algiers-bound space available was on a plane carrying General Larkin which was to take off Tuesday.

On Sunday, 6 February, Major Allis and I contacted two British officers, Commander Henderson and Lt. Commander Plunkett, the latter a bomb-disposal specialist, and arranged a combined Anzio effort. In addition to the four of us, I was to take Gerry Beatson and Lieutenant Brownell, attached to us from Naval Intelligence. The move was rescheduled for the night of 9 February.

My trip to Algiers was successful. Cooperation from Admiral Lewis, Commander, Naval Forces, Northwest Africa Waters (COMNAVNAW) was assured. The Admiral directed his intelligence officer, Captain Backman, to work out details with the Naval Command in Naples. I also had an opportunity to meet and give a report to Lt. Gen. Jacob L. Devers, the Deputy Commander-in-Chief. This was my first meeting with one of our greatest World War II commanders. More than any other commander, he was to give his personal and direct support to Alsos operations throughout the war.

The third key senior officer I met on this trip was the British Major General, Kenneth Strong, whom I had avoided when first reporting to Algiers. As General Eisenhower's G-2, he was entitled to be fully informed of all intelligence activities. Yet my instructions were to give him no information about my mission. At his request, transmitted to me by his affable aide, Capt. Kenneth Keith, I spent twenty minutes with those officers, having a cup of tea and evading the General's queries relating to my activity and at times even misinforming him. No one had ever told me that General Strong had been briefed on my activities and that Washington was aware of that.

Luckily for me, space was found on a C-47 which would drop me at Naples a few hours before our scheduled departure for Anzio. There was just enough time for me to confer with the OSS chief. "Plan on the PT boats," I told him.

The night of 9 February remains vivid in my memory. The LST was boarded in Naples harbor. Gerry arranged to have our two vehicles backed on last.

"If the Nazis open up on us when we hit the beach, Chief," he told me, "we'll be the first to get off."

Lieutenant Chase, the LST skipper, was a Tennessee banker in civilian life. He gave a British Brigadier, Scott-Elliot of the Black Cat Division, and me the use of his cabin. The constant roll of the vessel made me disgustingly sick. When Ensign Tanner, the Exec, walked in at about four A.M., I was delighted. I figured he had come to wake us for the landing. "Would you gentlemen like some coffee?"

"When do we land?" was my feeble response.

"We haven't left the outer harbor yet. The sea is too rough. We're at anchor."

The delay forced us to make the run in daylight. We passed in full view of Taracino, from which our convoys were often shelled. Luckily the Krauts did not waste ammo.

Late in the evening, as the LST approached Nettuno, adjacent to Anzio, we were treated to dazzling Fourth of July fireworks. Four times Nazi planes dived on us and were beaten off by the ship's anti-aircraft guns. Colorful tracers streaked the darkening sky and a huge orange flare from a direct hit on a plane was an encouraging sight to see. As the LST beached and the ramp dropped, we were off and running. We did not stop our vehicles until clear of open beach. At the disembarkation point we were told to find shelter for ourselves, having been warned that the entire area was within range of the German guns and that we could expect them to open up some time during the night. While looking for a place to bed down, we ran into a couple of chaps on foot trying to find the Command Post. They told us they were reporters and they looked it—no combat equipment or bedrolls. I remember that one of them was Traynor of the *Los Angeles Times*. At my suggestion, they spent the night with us in an abandoned one-story stone house.

The next morning one of our guests accompanied us to the II Corps CP. At one end of the square in Nettuno we

minding me of a pitcher's nervous motions as he prepares to pitch. Larry and Carl were unusually quiet.

George Eckman, up from Paris for a conference, wanted last-minute instructions regarding the availability of operational personnel for the several projects we had in the mill. It was also important to George to have the scientific landing party, which was to assemble in Paris, ready to take off in the event the air drop was successful. However, in true Eckman fashion, he remarked, "So off you go on another little lark. You characters do anything to avoid routine work—"

With Paris so close to our rendezvous point, it was natural for the men to want to make a run for that gay city. No activity being scheduled for us until the following afternoon, there was no reason to deny their request other than to keep one of them with me in case of emergency. Eddie Dolan drew the low card.

An hour after the men left, George Eckman was on the phone advising me of an urgent need for my unit to return to Heidelberg. "Boris, you'll have to stick around on the ground for a while. A friend of Sam's by the name of Dave will meet you in Heidelberg tomorrow and give you the dope. The other one is opening up and Sam is anxious that you go in behind the bayonets." George was telling me that we were to hit Stadtilm. "Stop off to see Gene Harrison," he continued. "We'll try to get a preliminary message to him."

"George," I told him, "Brownie, Carl and Gerry are on their way to Paris. They are to contact you at ten tomorrow morning. Have them report to Corps Headquarters in the area where I'll be operating. Instructions will be left in the G-2 office. If you can reach them before that, so much the better. Anything else you can tell me?"

"Nothing except that Sam is on pins and needles about this one. Good luck."

Late that night I briefed the duty officer of the 13th Airborne staff on the most recent developments and asked him to tell General Chapman that we would be away for a few days. We allowed ourselves a three-hour nap. At one o'clock on the morning of 10 April, Eddie Dolan and I pulled out for Sixth Army Group Headquarters in Kaiserslautern—a 300-mile trip.

The Germans were showing signs of collapse. The planes originally assigned to Operation Effective were now committed to other operations, including a possible airborne sally

HEADQUARTERS
THIRD UNITED STATES ARMY
APO 403

11 April 1945

MEMORANDUM

To: Commanding General, VIII Corps.

1. This will introduce Colonel B. T. Pash, GSC, 0-275746, whose signature appears below, who is on a special mission for the Supreme Commander in connection with a matter of great importance.

2. Colonel Pash's party consists of five (5) officers, two (2) agents and four (4) enlisted men, with two (2) armored cars and four (4) ¼-ton trucks.

3. It is requested that he be given whatever assistance he may require in carrying out his mission which is of particular interest in the area of STADTILM (J 34).

By command of Lieutenant General PATTON:

PAUL D. HARKINS,
Colonel, GSC,
Deputy Chief of Staff.

against Berlin itself. Our air strike into Wurtemberg was off. This meant not only setting up the Stadtilm operation on the run but also giving proper instructions to our planners in Heidelberg so they could prepare the ground operation against Wurtemberg targets. The bulk of the work would fall on Dick Ham and Bob Blake.

Before leaving Army Group I phoned Dick Ham. He would prepare the Stadtilm unit for the move. I told him it was to comprise a twenty-man task force with the two armored cars and as many jeeps as would be required. There would be no time to coordinate the operation with the field commanders and it might be carried out in the midst of the fighting.

Eddie and I traveled along a country road toward the Autobahn. As we neared a wooded area, five rifle shots cracked out and we heard the buzzing of the slugs as they passed over our heads. The shots had come from a stand of young pine to our left. The jeep shuddered to a panic stop.

"The shots all came from one direction, Eddie," I said.