STUDENT NOTEBOOK

ELEMENTARY WEATHER

NAME A/C CANARY G.W. JR.

SECTION I - INTRODUCTION

1. Why should a pilot understand the basic principles of meteorology?
Only when a pilot understands why a certain weather is found will he know how he may or may not fly through it in order to avoid danger types of weather are variable and no set rules will tell a pilot how to fly in each type

2. Why should a pilot understand the specialized meteorological terms which are necessary to describe weather conditions? Because otherwise valuable weather information available to him will be useless and perhaps he would fly into bad weather by not understanding a certain word or symbols.

3. May what is considered bad weather in peace time be favorable weather for the performance of a military mission in time of war? If so, illustrate. In war the performance of a military mission may be far more important than safety from weather hazards. Also in war flying is done whenever it is necessary for the safety of the nation

4. How may pilots be of assistance to weather forecasters in war zones?
In terrain over enemy lines there are no weather reports and the only can be obtained from our pilots and in order to maintain useful weather services, information as to atmospheric conditions in all surrounding territory must be obtained.

5. Why is it of great importance to pilots to be able to read and understand airway teletype reports? teletype is the most common way of receiving weather reports. There are a large no of weather observations all over the U.S.A send report in by teletype to all points. Also pilots who are making cross country flights must be able to read and understand it for it is posted in teletype form

SECTION II - AIRWAY WEATHER OBSERVATIONS AND REPORTS

6. Why is the classification of report important? To know what kind of landing is required to make landing or fly to a certain airport. or to know if field is closed or open instruments or contact

7. What do the following symbols mean?

C Constant flight rules

N. instrument flight

X Closed for take off or landing

8. What are special and record observations, and what is the purpose of each?
Record observations are sent every hour and in the half hour
use to tell of all information about a certain site.
If a marked change in the weather has occured - special
reports are sent out at the time of occurance not SPL

9. Decode the following:

a. 0037 M 12:37 am Mountain war time

b. 1942 E 7:42 PM Eastern Standard war time

c. 0600 C 6 am Central Standard " "

d. 2211 P 10:11 PM Pacific Standard " "

10. Define ceiling. is the vertical distance from the ground
to the base of the lowest cloud when that distance is
less than 10,000 ft and the sky is covered 5/10

11. Under what conditions would the ceiling be given as zero?
If the ceiling is 50 feet or less it will be reported as 0

12. Decode the following ceiling reports:

a. 75 7500 ft

b. 30 3000 ft

c. 6 600 ft

d. E10 Estimated 10,000

e. Unlimited Ceiling

13. Given the following layers of cloud covers, what is the ceiling in each case?

a. 1st layer 2000 feet 2/10 of sky covered
2nd layer 4000 feet 4/10 of sky covered
3rd layer 8000 feet 10/10 of sky covered

Ceiling is 4000 ft.

b. 1st layer 4000 feet 3/10 of sky covered
2nd layer 12000 feet 8/10 of sky covered
3rd layer 20000 feet 10/10 of sky covered

Ceiling is 12000

c. 1st layer 1000 feet 8/10 of sky covered
2nd layer 7000 feet 10/10 of sky covered

Ceiling is 1000 ft

d. 1st layer 2000 feet 1/10 of sky covered
2nd layer 5000 feet 3/10 of sky covered
3rd layer 8000 feet 2/10 of sky covered

Ceiling is 8000

14. Give three ways in which the ceiling is found.

a. By using the balloon

b. for accurate determination of ceiling projector

c. intersection of the Clouds with prominent objects

15. Name a fourth method by which the ceiling is obtained.

16. Decode the following symbols for sky condition:

a. O Clear or less than 1/10 Sky Covered

b. ⊕ Scattered more than 5/10 less than 9/10

c. ◍ Broken more than 5/10 not more than 9/10

d. ⊕ Overcast more than 9/10 covered

17. The following are "conditions of the sky" excerpts from airway teletype reports. Interpret in words all information given or implied.

a. 60⊕35◍ 6000 Ceiling overcast 3500 scattered lower

b. 70⊕/◍ Ceiling 7000 ft Broken hi overcast above 10,000

c. E9⊕ Estimated Ceiling 900 ft overcast

d. 40◍◍ Ceiling 4000 ft Broken lower scattered

e. 60⊕/◍ Ceiling 6000 ft Broken hi overcast above 10,000

f. 15◍◍ Ceiling 1500 Broken lower Broken

g. O Ceiling unlimited (above 10,000 ft)

18. When is the condition of the sky omitted from airway teletype reports?

If ceiling is unlimited

19. In airway teletype reports what do High and Low Clouds mean?

Hi Clouds those more than 10,000 ft above surface
Low clouds those less than 10,000 ft above surface

20. Give your definition of visibility.

Visibility is the greatest distance toward the horizon that prominent objects such as mountains buildings towers etc can be seen and identified by the naked eye

21. What is indicated by the omission of the visibility in an airway teletype report?

If the visibility is 10 miles or more no report is made and can be Construed as unlimited

22. What does the letter "V" in connection with ceiling or visibility indicate?

V means a variable visibility

23. Decode completely the following excerpts from airway teletype reports:

a. ⊕/6 Ceiling 600ft overcast above 10,000 ft variable

b. 10⊕02V Ceiling 1,000 ft Broken overcast lower Visibility 2 V

c. O Ceiling is unlimited (above 10,000)

d. 01/2 ½ visibility (½ mile Ceiling unlimited

24. What is the difference between:

a. Hail and snow pellets?

Hail is a fall of ice balls or stones with diameters from 1/5 to 2 inch or more, transparent or alternate layers of clear and opaque ice falls with violent & prolonged thunderstorms. Snow pellets are white opaque grains, crisp and easily compressed, fall exclusively with showers.

b. Sleet and freezing rain?

Sleet fall of transparent globular grains of ice formed by freezing of rain drops. 1/25 to 4/25 inch in diam. Freezing rain is a fall of liquid drops of water which freeze instantly upon striking objects in the open

c. Fog and ground fog?

Fog is the suspension of water particles in the air condensed from a the vapor state clumping in intensity by the degree of its limits of visibility. Ground fog is fog which only occurs in a shallow layer so that sky is visible from the ground. It is reported in the same way as fog.

d. Drizzle and rain? Rain is a fall of liquid drops of water whose diameter is greater than 1/50 inch
Drizzle is a fall of very fine drops of liquid water and the drops appear to float in the air less than 1/50 diam.

e. Drifting snow and blowing snow? Drifting snow is similar to blowing snow except that it remains close enough to the ground for the sky to be seen.
Blowing snow, when actually no snow is falling but is picked up from the surface and blown about in clouds or sheets reducing visibility it is reported as blowing snow

25. Encode the following:

Light rain	R-	Dry haze	H
Heavy thunderstorm	T+	Damp haze	F--
Moderate snow	S	Light fog	F-
Light drizzle	L-	Moderate fog	F
Heavy freezing drizzle	ZL+	Thick fog	F+
Moderate sleet	E	Dense fog	FF
Light rain squall	RQ-	Thick ground fog	GF+
Thunderstorm	T	Moderate ice fog	IF
Heavy freezing rain	ZR+	Dense ground fog	GFF
Moderate hail	A	Light ice fog	IF-
Heavy snow showers	SW+	Moderate blowing dust	BD
Moderate snow squalls	SQ	Thick blowing sand	BN+
		Light blowing snow	BS-

26. Decode the following:

K+	Thick smoke	F--	damp haze
L-	Light drizzle	GF-	Light ground fog
S+	Heavy snow	IF	Moderate ice fog
R	Moderate rain	GF+	Thick ground fog
ZR	Moderate freezing rain	FF	dense fog

H	Dry haze	BD-	light blowing dust
T+	heavy thunderstorm	BN	moderate blowing sand
D-	light dust	BS-	light blowing snow
T	moderate thunderstorm	GS+	thick thick drifting snow

27. Decode the following barometric pressure reports:

000 1000 mB

782 978.2 mB

087 1,008.7 m.B

400 1400 mB

28. Encode the following barometric pressure reports:

998.0 millibars 980

1015.6 millibars 156

1000.2 millibars 002

29. If the barometric pressure at the surface is 1025.0 millibars and the pressure decreases about 34 millibars for every thousand foot increase of elevation, what will the pressure be at 7500 feet?

7700 mB

30. Decode the following excerpts (properties of the air) from airway teletype reports:

015/65/64	1,001.5	65°F	64°F
895/44/44	989.5 mB	40°F	40°F
999/35/18	999.9	35°F	18°F
138/-12/-20	1013.8 mB	-12°F	-20°F
450/2/-2	1015	2°F	-2°F
000/85/67	1000	85°F	67°F

31. A weather station reported a temperature of 52° F. early in the evening. When the temperature dropped 12° F., fog formed. What was the approximate dew point?

40°F

32. Why are no wind arrows included in the report when the condition is calm? How is a calm reported? Calm is when the air is still

Calm reported by C

33. What is indicated when a plus or minus sign is found in the reports immediately following the wind velocity? Why would this information be of importance to pilots?

– means fresh just, + means strong just blank means steady flow. One would have to know what kind of wind to expect from a certain direction in order to know wind drift and crab angle. if steady strong etc.

34. Decode the following excerpts of winds from airway teletype reports:

↑10 South 10MPH Steady

↓↙25 North-North East 25MPH Steady

→15- West 15MPH fresh just

↓↘45+ North North west 45MPH Strong just

↘13 Northwest 13MPH Steady

←6 EAST 6MPH Steady

↗11 Southwest 11MPH Steady

35. Decode the following:

↓33+↗0814C+ NORTH 33MPH Strong just SEREVER wind shifted from Southwest 8:14 am Central

→20↖1755E West 20MPH steady MODERATE wind Shift Southeast at 5:55 pm Eastern time

36. Is it a good idea to reset the altimeter on cross country flights? Explain.

yes, because the place where you set it on take off may be low or above sea level and might register a certain height above ground but really be. Closer to it such as mountains obstructions

37. Decode the following altimeter setting reports:

995	29.95 inch mercury	032	30.32 hg
000	30.00 hg	899	28.99 hg

38. Decode the following additional remarks:

BINOVC Breaks in overcast PIREPS Pilot reports

BRONO Broken but not solid SCTD Scattered

CIG Ceiling TOVC top of overcast

ICG Icing TSTM Thunderstorm

MSL Mean sea level VSBY Visibility

RANOT Radio range not operating QUAD Quadrant

39. Decode completely the following airway teletype weather reports:

FV C -Φ/6H 140/55/51+3/994
Fort Worth - Control hi thin scattered 6 miles Haze (dry) 1014.0 MB
55°F 51°F North 3 MPH Steady 29.94

XN X 01/5ZL-F+ 143/29/29+8/996
Austin tops Closed ceiling 0 ½ mile Visibility light drizzle
Check fog 1014.3 MB temp 29°F 29°F South west 8 MPH
Steady 29.96 hg

CG X SPL 0655C 3⊕3/4IF- 193/26/25←↙10/001/PIREPS +ICG IOVC

Chicago Closed special 655 am Central 300 ft ceiling 3/4 mile visibility ne fog light Bar press 1019.3 mb temp 26°F dewpt 25°F Wind East Southeast 10 mph alti 30.01 hg pilot reports heavy icing in over cast

FI C 003/43/12↓↘18/954/H LYRS ALF

Fort Sill Ceiling unlimited sky clear Visibly unlimited 1000.3 MB 43°F temp dewpt 12°F North northeast 18 mph steady 29.54 hg haze layers aloft heavy

LS O1/2K+ 130/40/31↘28+/992/VSBY DCRSG

ST Louis Ceiling unlimited clear sky 1/2 mi Visibility heavy smoke 1013.0 MB temp 40°F Dewpt 31°F Northwest 28 MPH strong gust 29.92 hg visibility decreasing

OL X SPL 0155C 20⊕6⊕1/2VBD+ 123/30/21↘39+↗0140C+/990/
GUSTS OCNLY 60 BRM RSG RPDLY

Akal City Closed special 155 Central wartime ceiling 2000 broken over cast 600 ft. 1/2 mi Visibility variable Blowing dust 1012.3 MB temp 30°F Dewpt 21 Northwest 39 MPH strong gust Sunday Northwest 1.40 am alt set 29.90 Gust only 60 Brm. Rising rapidly

SECTION III - WEATHER MAPS

40. Plot the following information around the indicated station circle:

a. Sky condition - overcast (10/10 covered)
Wind - NW at 20 mph
Present wea. - Moderate continuous rain
Visibility - 1 mile
Ceiling - 2000 feet
Clouds - Nimbostratus moving from the northwest
Temperature - 45° F.
Dew point - 42° F.
Barometric pressure - 998.6 millibars
Barometric tendency - rising, then falling; net change in last 3 hours was -2.0 millibars
Past weather - .10 inches of rain which started falling at 1100 A.M.



b. Sky condition - obscured
Wind - S at 3 mph
Present wea. - thick fog
Visibility - 1/4 mile
Ceiling - zero
Temperature - 39° F.
Dew point - 39° F.
Barometric pressure - 1008.0 millibars
Barometric tendency - rising steadily; net change in last 3 hours +.5 millibars
Past weather - .05 inches from drizzle which stopped falling at 0600 A.M.



c. Sky condition - clear
Wind - calm
Present wea. - none
Visibility - 12 miles
Ceiling - unlimited
Temperature - 95° F.
Dew point - 70° F.
Barometric pressure - 1013.2 mbs.
Barometric tendency - falling steadily; -0.4 mbs. in last 3 hours
Past weather - none



41. Give the symbols for the following as they would appear on the weather map:

	Rain	Snow	Drizzle
Light continuous			
Moderate continuous			
Heavy continuous			
Light intermittent			
Moderate intermittent			
Heavy intermittent			

(Note the system used, and you will not have to guess.)

42. Answer the following questions:

a. How are areas of continuous precipitation colored? _____

b. How are areas of intermittent precipitation colored? _____

c. Are stations colored at which precipitation is indicated in the past weather position without any indicated in the present weather position? _____

43. Write with a lead pencil the symbols for the following in Column 1. Indicate all coloring necessary in Column 2; do not explain - just use your colored pencils.

	Column 1	Column 2
smoke		
haze		
light or moderate rain shower		
sleet		
mild thunderstorm		
heavy thunderstorm		
light or moderate snow shower		
freezing drizzle		
ground fog		
heavy intermittent rain		
light continuous drizzle		
light intermittent snow		
light fog		
threatening sky		
thick fog		
dust or sandstorm		
light drifting snow (low)		
thick fog with drizzle		
thick fog with rain		
light or moderate hail		

44. How would the following be shown on the weather map? Write the symbols used; do not indicate coloring.

a. Thick fog that has increased during the last hour. _____

b. Snow occurring within sight of the station but NOT at the station. _____

c. Rain that fell during the last hour, but which is NOT falling now. _____

45. Define an isobar.

46. Why can two isobars never cross?

SECTION IV - WINDS ALOFT

47. Decode completely the following winds aloft teletype reports:

CG18 01608 1610 21815 1820 42125 2226

Station _____ Time _____

ALTITUDE	DIRECTION	VELOCITY
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

CX18 01010 1220 81226 1230 01532 1740 21842

Station_____ Time_____

ELEVATION	DIRECTION	VELOCITY

XXII 03695 68000 8405 88608 5110 05312 5912

Station_____ Time_____

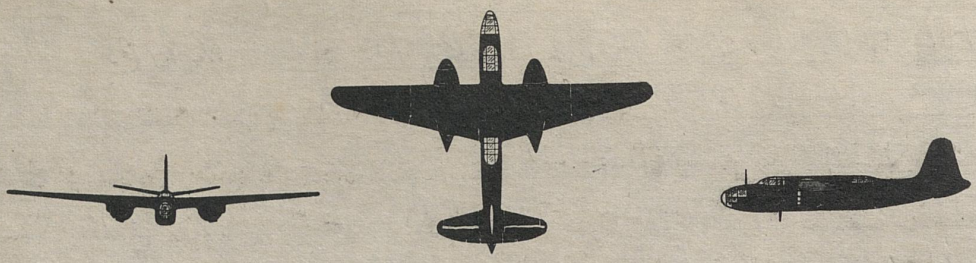
ELEVATION	DIRECTION	VELOCITY

48. On winds aloft reports, how is a north wind reported? _____

49. What does a report of 0000 indicate? _____

Type OA9	Mfr. GRUMAN Designation OA9
W	HI WG. FLAT AG. LE TP + TE TP CR TIPS
E	TWIN RADIALS CT IN WG EXTEN ½.
F	Reg FLYING HULL
T	S.G. LE TP TE TP TIPS CR LE TR TE TP
O	WHEELS in FUS CABIN WINDOWS
Type OA10 PBY5	Mfr. CONSOLIDATED Designation OA10 PBY5
W	PLAT-HI FLAT LE TE ST SQ TIPS
E	TWIN RADICAL LE. SHI CELL
F	LOW FLYING HULL LG TAIL BOOM 2 SIDE BLISTERS
T	SG. LE TP TE TR CR TIPS FIN TR LE + TE CR TIP.
O	
Type PBM1	Mfr. MARTIN Designation MARNIER PBM1
W	HIG RET. WG FLOATS GULL STLE TP TE CR TIPS
E	TWIN RADICAL LE INAG. WRIGHT CYLONE
F	REG DEEP FLY HULL BULLDOG NOSE
T	TWIN VER PRED TO DIHEDRAL LE STR TE
O	TURRET NOSE, TAIL ONE ON TOP TWO SIDE BLISTER
Type PB2Y2	Mfr. Consolidated Designation PB2Y2
W	HI FLAT WG TP LE STR TE SQ TIPS = RET FLOATS
E	4 PHATT WHINEY TWIN WASP
F	REG THICK DEEP FLY HULL LG TAIL BOOM
T	TWIN OVAL SHAPE DNO. DIHEDRT STR LE TE. CR TIPS
O	NOSE, TOP + STINGER TURR
Type A-29	Mfr. LOCKHEED Hudson Designation A-29 & PBO Boston Bomber
W	M.D NUR DIH LE TP + TE CR TIPS WRIGHT CYC
E	TWIN RADICAL SHI CELLS WRIGHT CYCLONE
F	SHI Chutti TURRET AFT REC GUN PLAT.
T	TWIN AS FIN EGL SHAPE TP LE STR TE INBOARD
O	

31.



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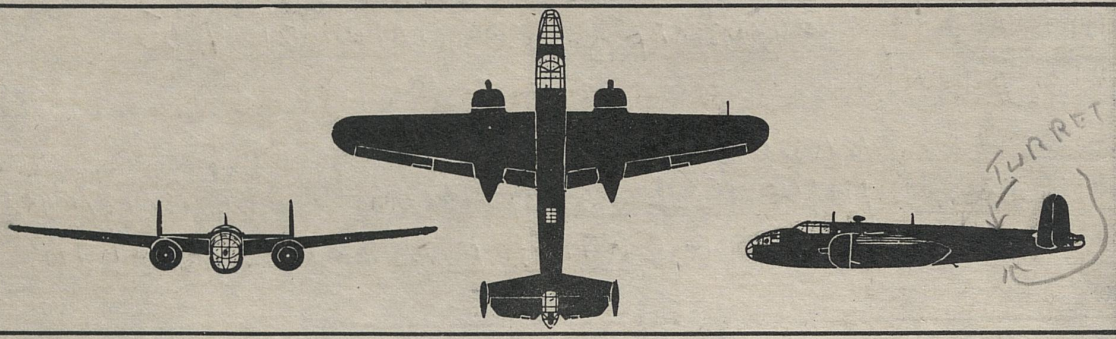

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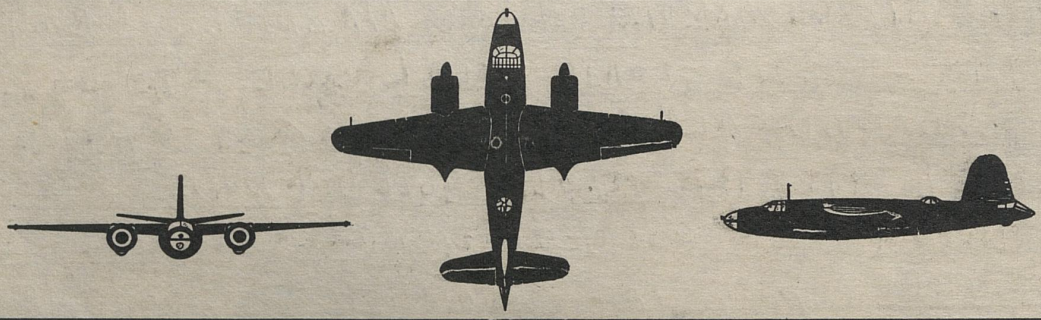

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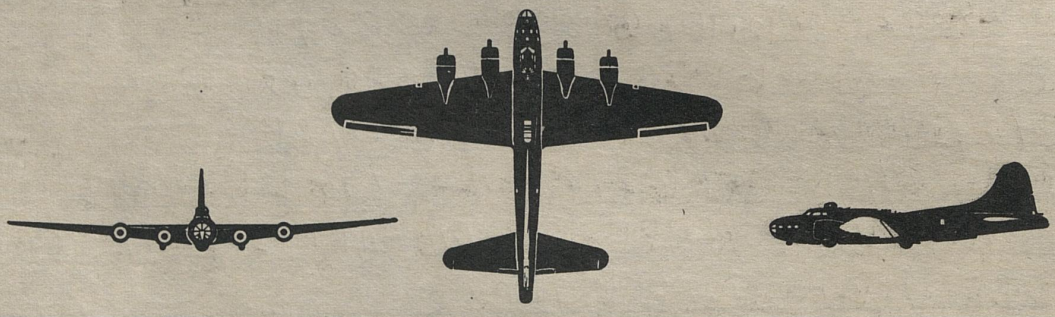

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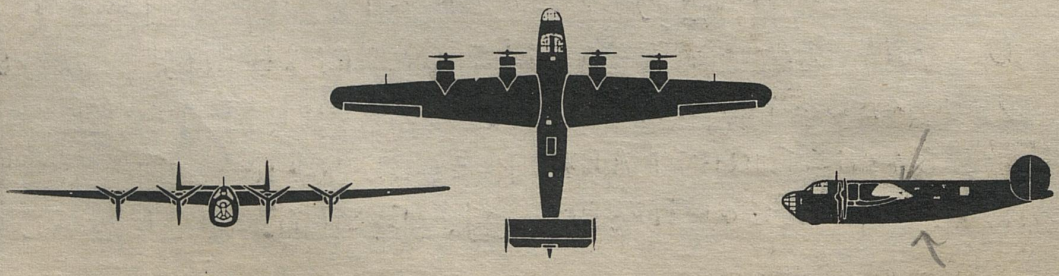
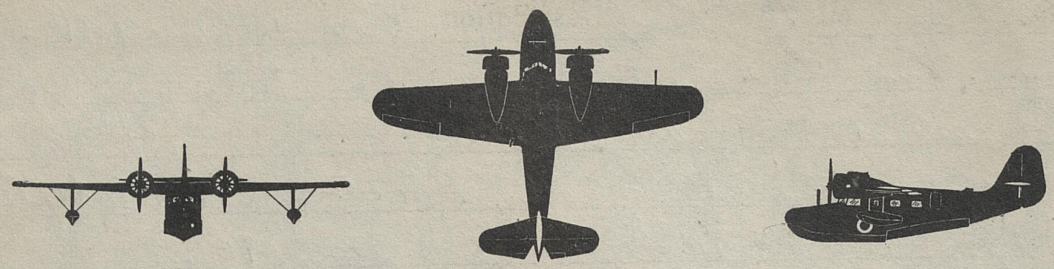


Type OS2U	Mfr. Vought Sikorsky Designation OS2U King Fisher
W	MID Wing NOR DIHEAREL ST.LE TP TE TIPS Curve
E	Sg Radical Pratt Whitney
F	Reg Blunt nose lg Cock pit divide 1/3 back Float extends Fore
T	Sg LE Cr. TE TP. → Fin Hor. ST.LE + TP TE
O	TRI BRACE ON PONTOONS TO FU. STRUTS VERT + ANGLE
Type S03C	Mfr. CURTISS Designation S03C SEAGULL
W	MID-WG NOR DIHEAREL ST.LE TP TE TIPS CRVED
E	IN LINE ENGINE INVERTED
F	Lg COCK PIT DIVEDE 1/3 BACK FIXED WHEEL OR PONTOONS
T	SG. TP.LE CR.TE FIN
O	EXUAST ON BOTTOM - PROVIDING HOR. TAIL PEICE
Type 047B	Mfr. N. AMERICAN Designation 047B TP.TE CR TIPS
W	MID. NOR DIHEAREL LE.ST ASLO-FLAPS
E	SG RADICAL WRIGHT CYLONE
F	SHT THICK BLUNT NOSE LG PIT INC. BIG BELLEY
T	SG TAIL V.T LE TP, TE CR TIP CR HOR TP TE CR.TE + TIPS
O	RECTABLE LANDING GEAR + TAIL WHEEL
Type 052	Mfr. CURTISS Designation 052 CURTISS OWL
W	HIG WIG FLAT WG. ST LE + TE TIPS CR
E	RADICAL ENG
F	BLUNT NOSE LG PIT COVER SHT FU
T	SG. HI. TP.LE + CR TE TIP CR FIN HI TP LE + TP TE Cr. TIPS
O	WHEELS IN FUSLAGE ANGLE STRUTS WG TO FU.
Type F2-C45	Mfr. BEECH CRAFT Designation F2 or C45
W	LOW PRO DIHERAL LE TP TE TP Cr TIPS
E	TWIN RADICAL EXTEND WELL FORWARD
F	REG CABIN
T	TWIN OVAL - TP LE + ST TE OVAL FIN
O	

26.



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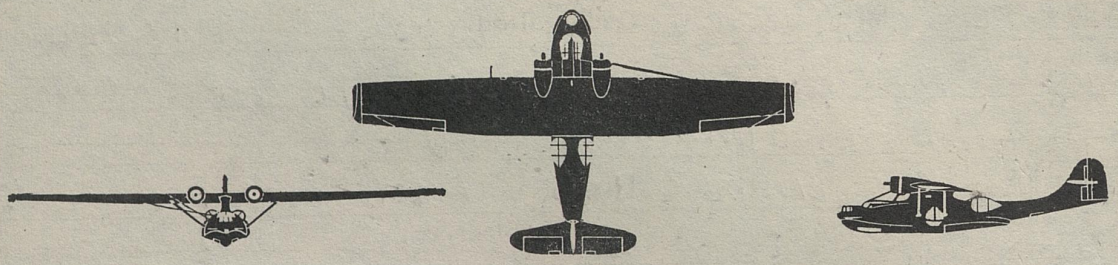

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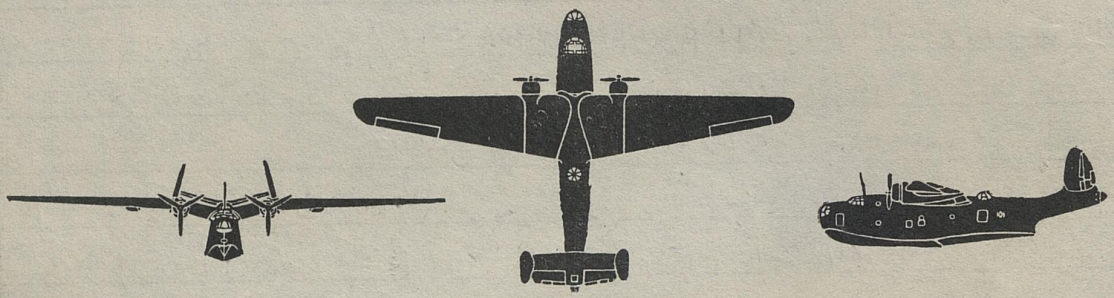

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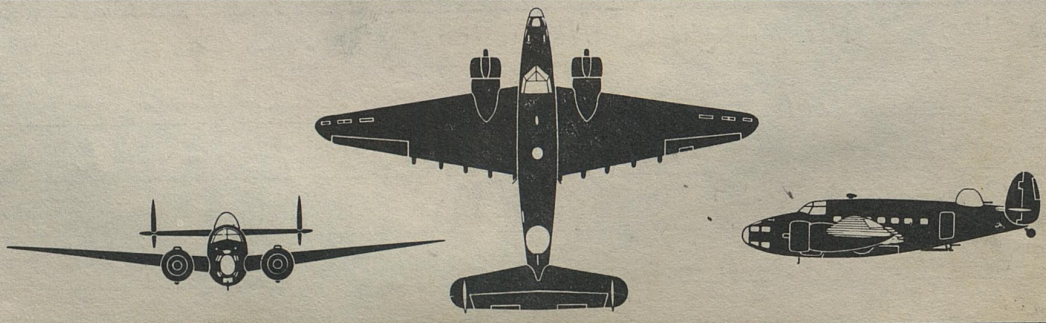

Type F2A	Mfr. BREWSTER Designation F2A BREWSTER BUFFLO A
W	LOW WING NOR MALE DIHEDRAL ST. LE TP TE CR TIPS
E	RADICAL SG. AIR COOLED
F	SHT. STUBIE - WHEEL IN F. TAIL W.H. LG. AERIAL FORE ABUT P.C. BLEND ALMOST TO TAIL
T	SG. LOW SET CR LE CR. T.E. FIN CR LE + TE CR TIP
O	L.G. IN F. AERIAL AFT P.C. (F2A3 7 folding wings)
Type F4F	Mfr. GRUMAN Designation WILD CAT (F4F) (marine) (lit)
W	MID WG NO DIHERAL ST (LE) TP. TE ST TIPS
E	SG RADICAL - A COOL.
F	SHT. STBWI - WHEELS - CP. ABUT FORE ST. AREIAL AFT P
T	SG ASSEM TP. LE + TE TP ST FIN CR LE + ST TE CR TIP MID SET
O	PIT CENTERED OWIG 4 Guns
Type F4U	Mfr. VOUGHT SIKORSKY Designation COSIAR F4U
W	LOW. WG INV. GULL TP LE + TE CR TIPS MONPL.
E	SG RADICAL A COOL - PRATT WHITNEY 400 mi +
F	MEDIUM CP. ABUT FORE + AFT SHT. AIR SOOP G. WG
T	SG ASS. TP. LE + TE CR TIPS FIN TP TE + CR LE CP TIPS MID SET
O	PROTUDES - Past Tail (Faster Naval sling in wake)
Type A-24 - SBD	Mfr. DOUGLAS Designation A-24-SBD-DAUNTLESS
W	LOW, NOR. Flat inverted DIHEDRAL. T.P. LE + T.E CR. TIPS. AIR FLAPS W RIGHT 2 gun
E	SG. RADICAL A COOL PT. PROP SHAFT
F	~~LG SKIM~~ Type C.P - CT. LE. ABUT FORE + AFT. LG. ATE IN FORE GN STA FORE
T	SG LOW SET TP. LE + ST TE CR. TIPS FIN TP LE + TP TE CR TIP
O	Wheel on Tail Down - Bomb -
Type	Mfr. Designation
W	
E	
F	
T	
O	

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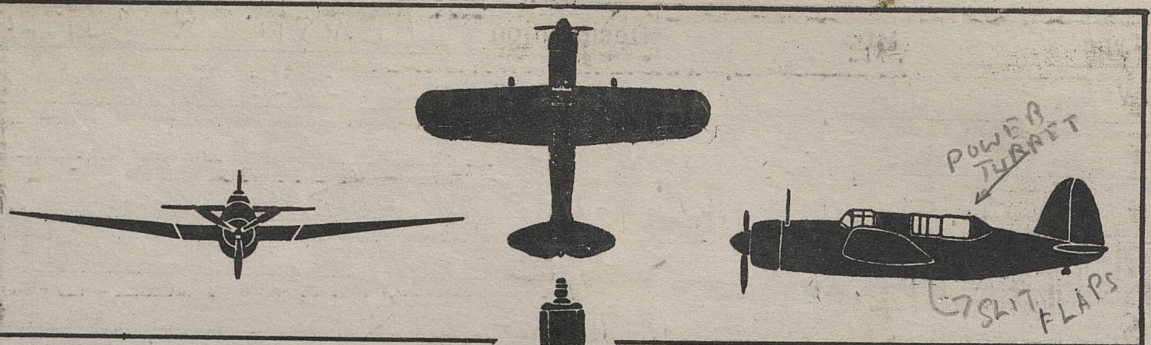

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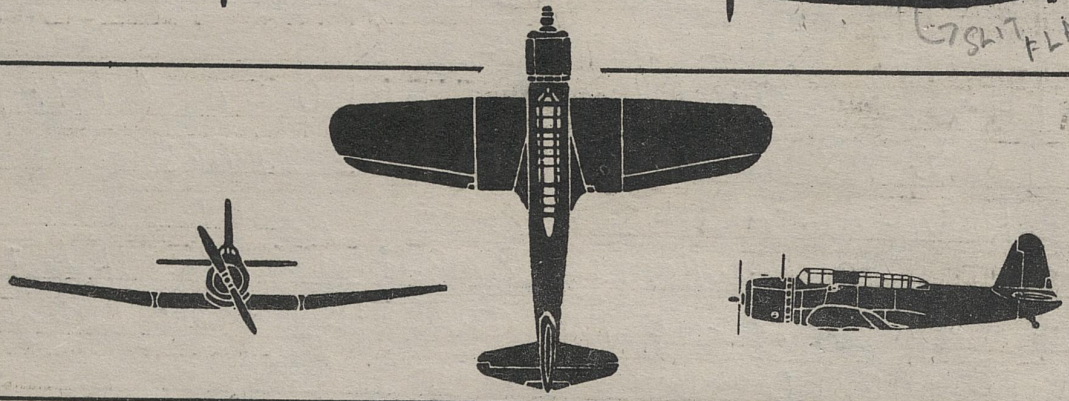

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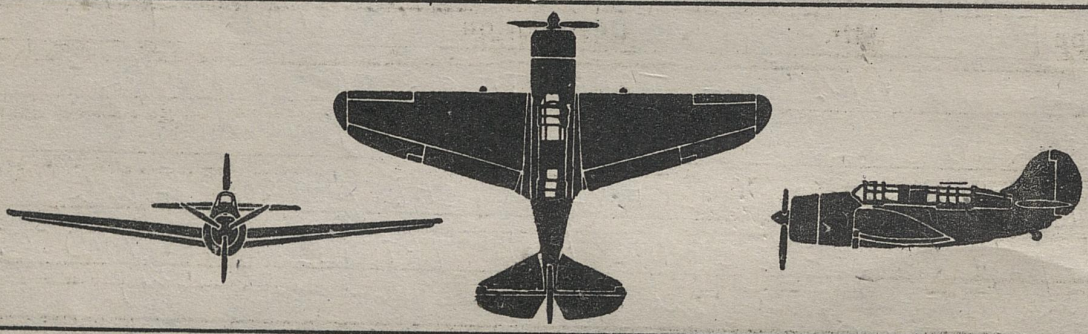

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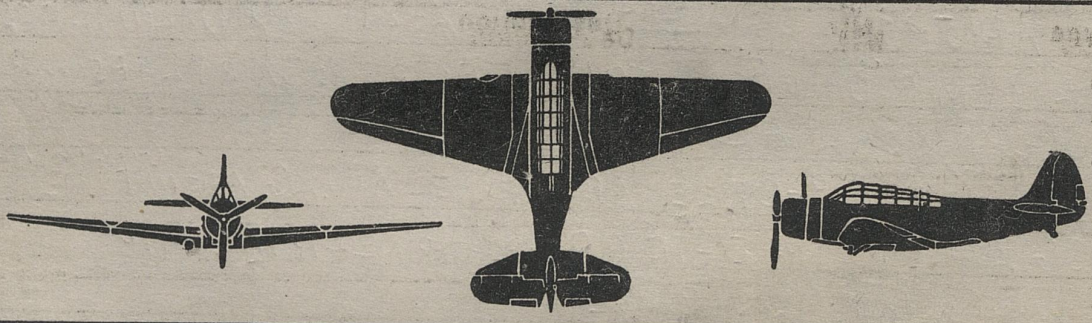

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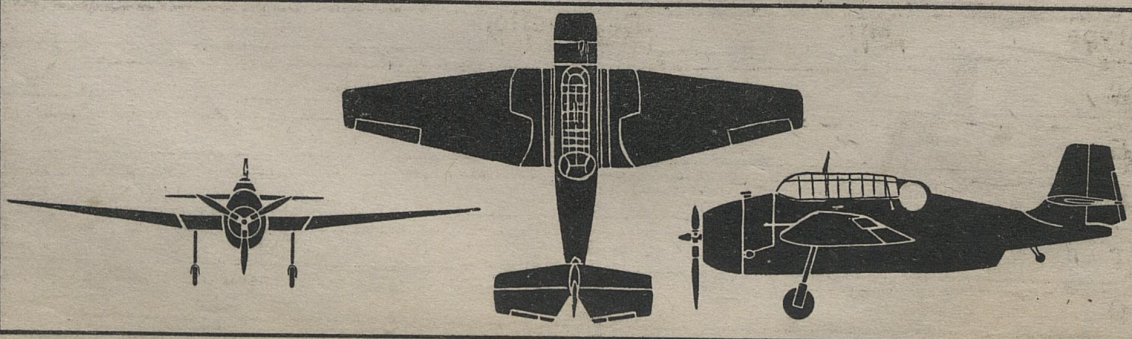
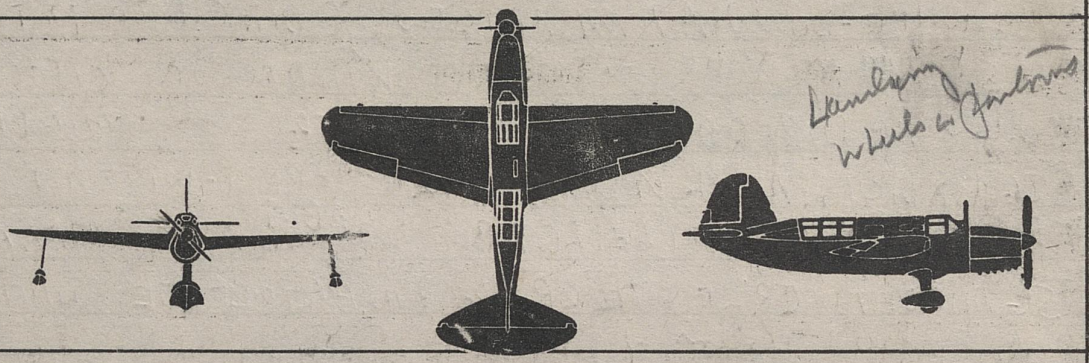


Type SB2A Mfr. BREWSTER Designation BUCCANEAR SB2A	
W MIDWG NORWG ~~ST~~ LE + TE CR TIPS	or Brunetta MONPL.
E SG. RADICIAL A COOL BIG PT PROP	
F LG. SLIM - FORE AB-SHT-SHT + SHT FORE + ABUT AFT	FORE CT on LEW
T SG CRLE - TE FIN HIG CRLE + TE	POWER TURRET
O TAIL WHEE-DOWN ATENA AFT COW LG DIT. COW TO TPIT	
Type SB2U Mfr. VOUGT SKOSKERY Designation VINDACTOR CHESPECK	
W LOW NR. DIHERDAL TP LE + TE CR. TPs	MONPL
E SG RADICAL A COOL VENTS ON COWL - PRATT-WITTNEY	
F LG SLIM C.P AFT LE. LG ABUT TO ~~BLEND~~ ABUT 2 SEC	ATENA AFT
T SG MIDSET CRLE + TE CR. TIPs FIN. HI CRLE + TE	WHEEL
O R-1700 2 guns - 1 gun AFT	
Type SB2C Mfr. CURTISS Designation HELL DIVER SB-2C	
W LOW PRO DIHERDAL ST. LE TP. TE CR TIPs	MONPL
E SG. RADICAL W. RIGT CYLONE 350 MI R1200	
F MEDIUM CP CENO LE ABUT-SHT-2 SEC	
T SIG ASS - TP LE CR TE CR TIPs FIN CR LE + TE CR TIPS (OVAL)	
O R.P ALMOST TO TAIL - TAIL WHEEL	
Type TBD Mfr. DOUGLAS Designation DEVASTATOR TBD	
W LOW NR DIHERDAL TP LE + TE CR TPs AIRSVOP - RT. WG	
E SG RADICIAL A. COOL W RIGT CYLONE 250 MPH	
F ~~LG. SLIM~~ Reg C.P. begins at Cow ABUT LOG TO SHT	
T SG. Ass. TP. LE + TE CR. Tips LE TP TE CR CR TIPS	
O NOTICE C. P. COVER	
Type TBF Mfr. GRUMMAN Designation AVENGER TBF	
W MID FLAT MID SET N DIHEARL TP. LE + TP TE SQ TP	
E SG RADICAL	
F SHT STUBBIE Blunt NOSE LOW PC. Power Turret AFT	
T SG FIN - LE TP - TE TP ST TIP LE TP - TE TP + ST TPs	
O Breaks aft C.P.C. -	

21.



22.



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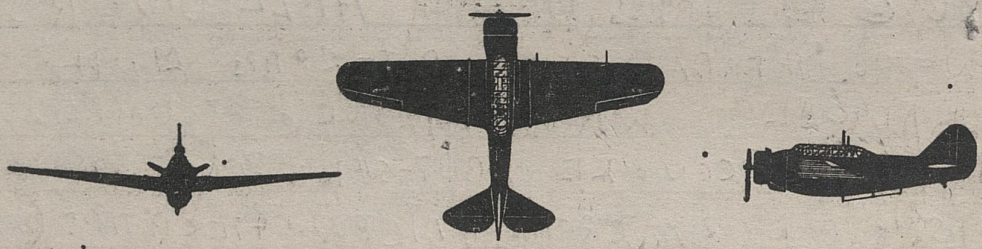

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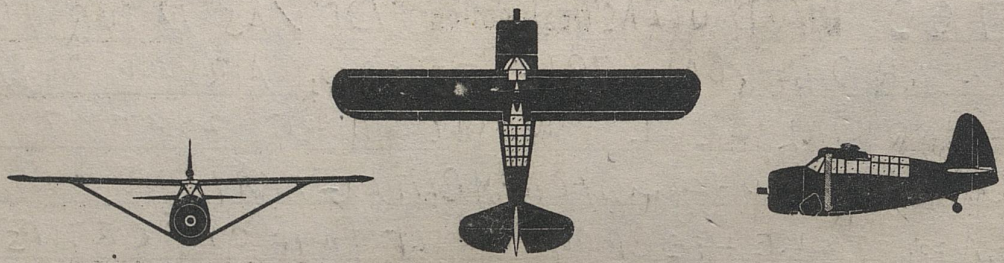

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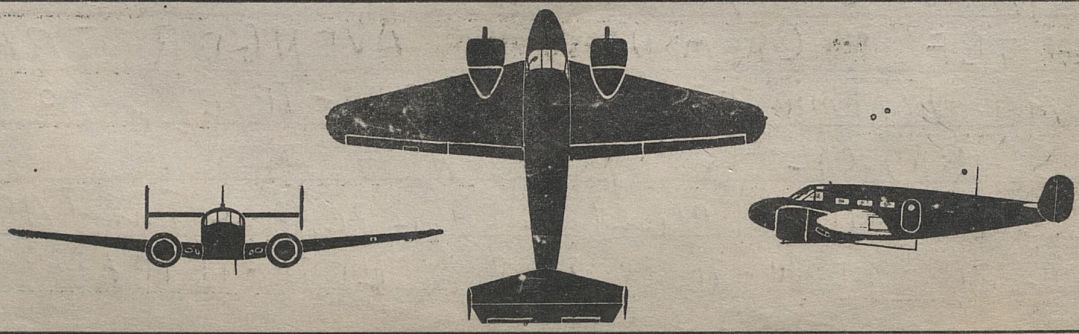
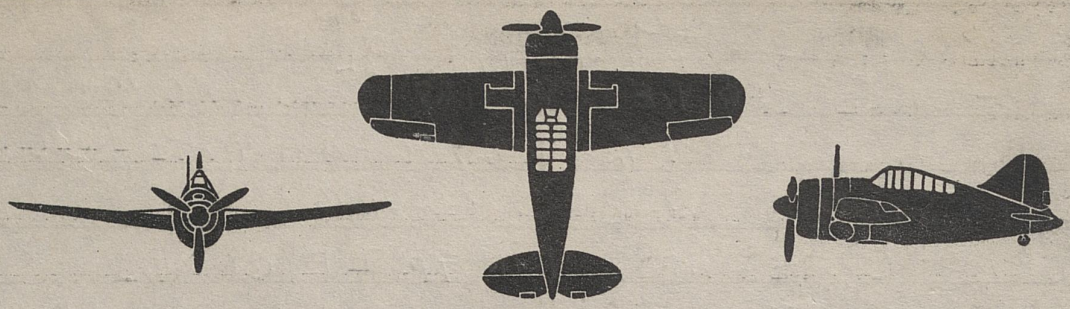


	Type P-35 Mfr. REPUBLIC Designation P-30	
	Present FLAT WIG NORMAL DIHERAL	
	W LOW - ST. LE CRV. T.E. CV. TIPS SEMI LAG. MON PL	
P35	E AIRCOOL STUB FT. COWLING - AIRVENTS - RADICAL	
	F SHT - STUBIE LG C.P.C. COWING	
	T TAP LE - CR. TE + TIP FIN TP. LE CRV. T.E	
	O L GEAR SEMI NOT FLUHIN WG. HUMP. APP. - P.C. AB. FOR	
	Type P-36 Mfr. CURTISS Designation P-36	
	Present NP DIHERIAL	
	W LOW - ST. LE TP. T.E CRV TIP MONPLANE KNEES	
	E RADICAL A COOL BLT. COWLING VEN BELOW	
P3-6	F MEDIUM - REG SMALL PIT	
	T MID WIG TP LE + CP TE + TIPS FIN TP. LE CR T.E	
	O CP'T COVER ABUT FORE + AFT L.G. FLUSH	
	Type P43 Mfr. REPUBLIC Designation P-43 = LANCER	
	Present N DIHERAL	
	W LOW ST. L.E CR TE + CR TPS	
P-43	E RADICAL A. COOL ST. FT COWLING	
	F SHT STUB SH. BLT. COW LONG C.P.C	
	T LOW WG TP LE + CR. T.E FIN TP. LE + CR T.E.	Present W Litter 30 + 50 guns
	O C.P. ABRUT FORE + BLEND GUN PTS TOP COW LG PPG SHT	
	Type P-47 Mfr. REPBULIC Designation P-47 - Chamber Bolt	
	Present RRN DIHERAL	
	W LOW ST. LE CR. T.E. CP TIPS MON PL	
P-47	E RADICAL AIRCOOL COWLING LG PPP SHFT AIRVENTS	
	F SHT STUBIE - THICK SHT P. IN	
	T MID WG TP LE CP T.E FIN TP LE + TE	
	O CP ABUT FORE + AFT SHT. PRAT WHITE 4000 MPH	
	Type PURSUIT Mfr. VULTEE Designation P-66 - VANGWARD	
	NOR DIHERAL	
	W LOW TP LE + TE CRV TIPS MON.	
P-66	E RADICAL AIRCOOL COWLING	
	F ~~SHT STUBIE~~ REG CP. CEN on T.E of WG	
	T LOW TAP LE + TE CR TIPS high FIN TP LE + TE	
	O TAILWHEEL C.P.C ABURT FORE + AFT	

FIX GUNS on COW 10 guns

11.



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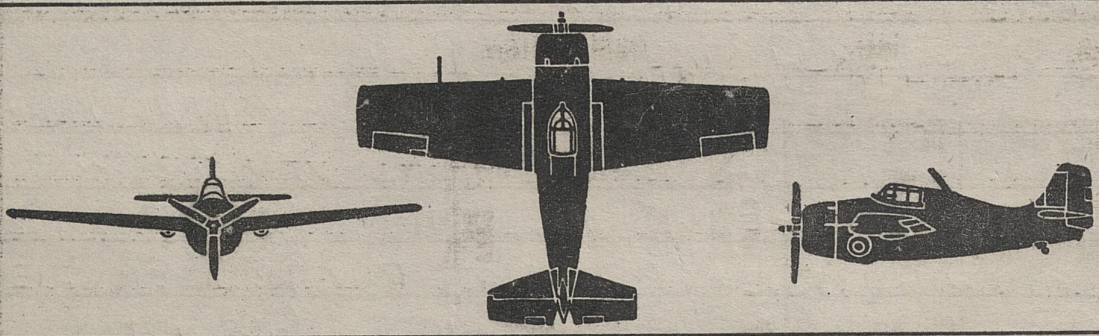

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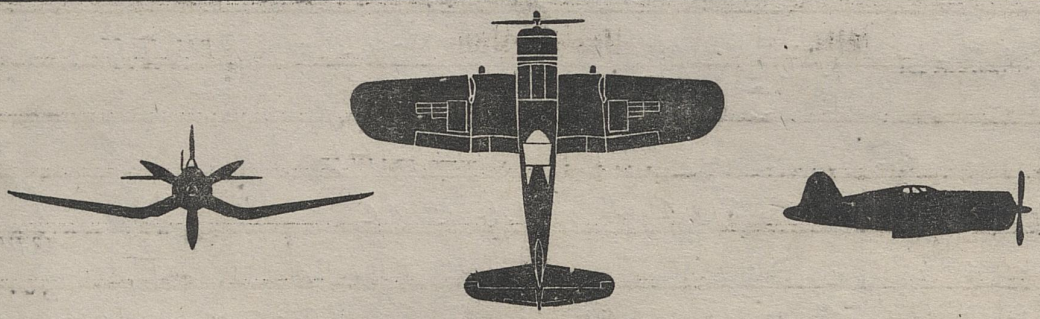

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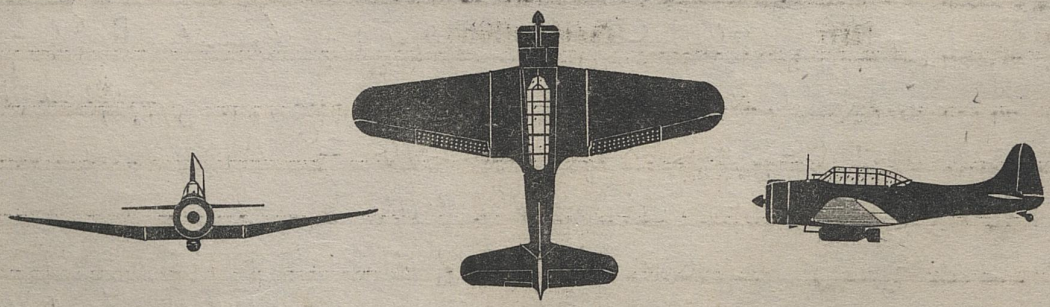
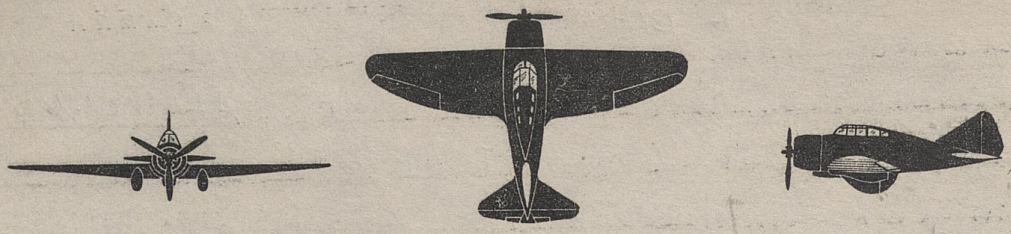


15.

Type P-39 Pruent	Mfr. Bell	Designation PURSUIT - P-39	
W	LOW WING NORMAL DIHERAL TAPERED L.E & T.E. CURVE TIPS AIR CORBA	MONPLANE	
E	IN LINE LIQUID COOL - REAR OF PIT	ALLSIO 1650	400MPH
F	MEDIUM - BUT SLIM TEAR DROP		
T	MID. SET SG HOR + VER TAP LE CUR. TIRS CUR. T.E		
P39 O	TEAR DROP PIT. AIR SCOOP BEHIND DOOR IN PIT TRC. GC	CANNON IN NOSE 37MM	
Type P-40 PURSUIT	Mfr. CURTISS - P40	Designation PURSUIT P-40 D KITTY	HAWE ETC
W	LOW WING NORMAL DIHERAL STR. L.E TAP. T.E. CURVE TIPS	KNEES MON PL	
E	IN LINE LIQ COOL ALLISON - 6EX STACKS		
F	MEDIUM POINTED NOSE - THICK FRONT C.P. ABUT FORE BLEN AFT CENTER OWG		
T	MID SET VERTICAL - TARLE. CV. T.E. HORZ - TARLE - CUR TIPS - T.E		
P-40 O	AIR SCOOP FT. OWING EX. OE SIDE ABRUT AFORE BLEN AFT	KNEES	
Type P-51 Pruent	Mfr. N. AMERICAN	Designation PURSUIT P-51 MUSTANG	
W	LOW WING NORMAL DIHERIAL TAP. LE & T.E SQ - TIP	MON PL	
E	IN LINE LQ. COOL 6EX ST Ea SIDE		
P51 F	MED. PT NOSE C.P. ABRUT FORE, BLEND (SMALL) SMALL RAD AF WING		
T	TP. LE ST TE FIN TP LE & TE SQ TIPS		
O	ALLISON ENG		
Type P-38	Mfr. LOCKHEED	Designation P-38 or F-4	
W	MID WIG. INTERCEPTER NORDIH. LIGHTING TAP - LE. TE CRV. TIPS	MON-PL	
E	TWIN LQ COOL PT INLINE - AIRVENT	AIRSCOOP	
P-38 F	LG SLIM - TWIN BOOM WIG BACK - SIG WG. FORE -		
T	TWIN IN-BORAD - EGG SHAP OVAL FIN MID WG	37mm 4 mach	
O	TEAR DROP PIT COVER TRI + LANDING CFARE PROP BDS	1200hp 400+	
Type	Mfr.	Designation	
W			
E			
F			
T			
O			

6.



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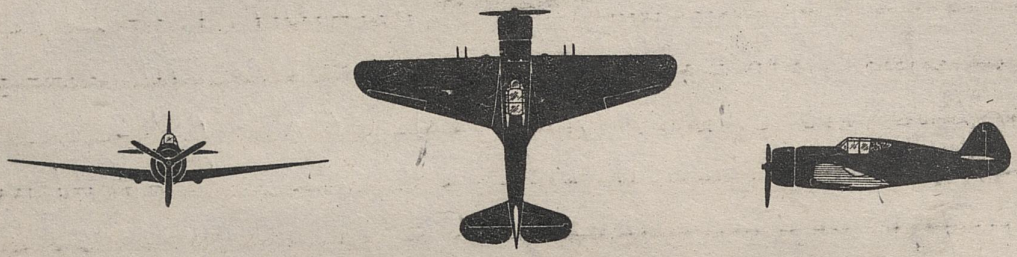

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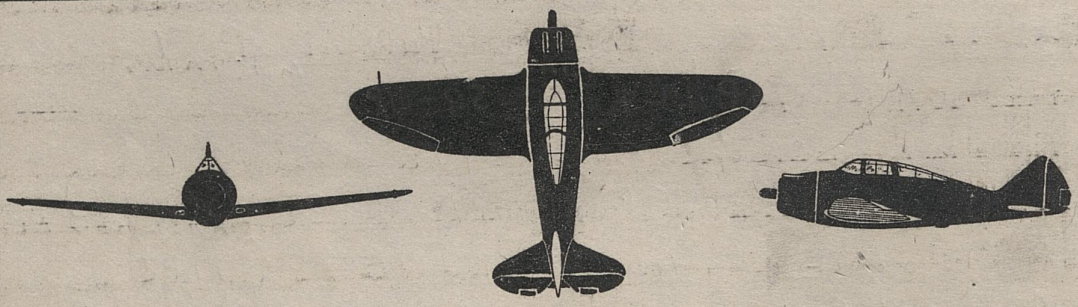

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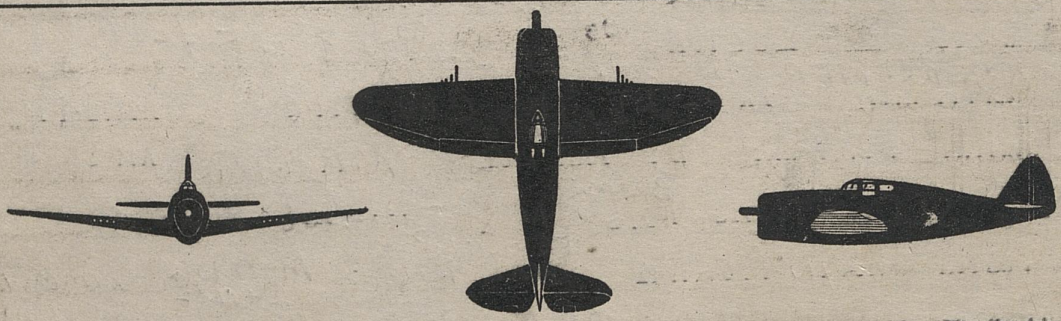

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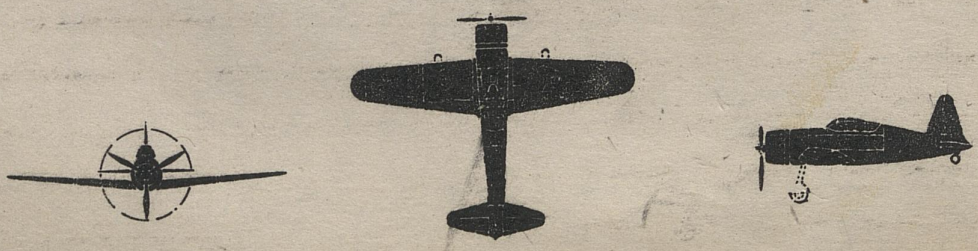
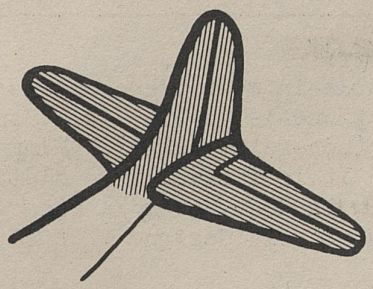


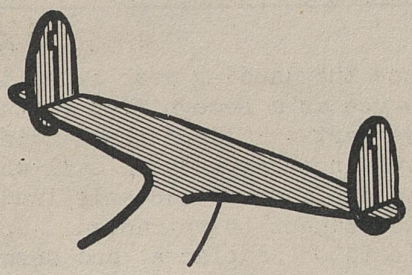
TAIL

The tail consists of one or two horizontal and vertical elements. It is described by stating the number and shape and relative position of these parts.

Number



Single horizontal, single vertical



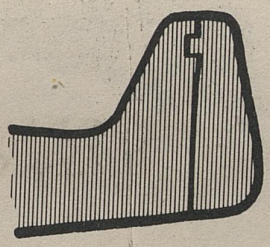
Single horizontal, twin vertical

Shape

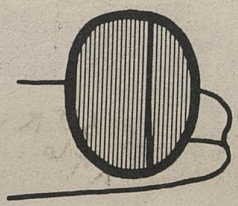
The same terms used for describing the wing are used for the tail elements.



TAILPLANE
Tapered leading edge
Curved trailing edge
Curved tip



FIN and RUDDER
Tapered leading edge
Tapered trailing edge
Square top



SPECIAL SHAPES
Distinctive shapes may be recognized - this is an oval fin and rudder

Position

Intersection of fin-rudder and tailplane



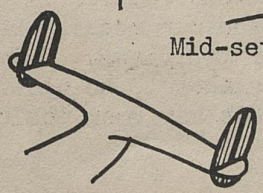
High-set



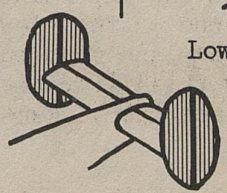
Mid-set



Low-set



In-board



Out-board

OTHER

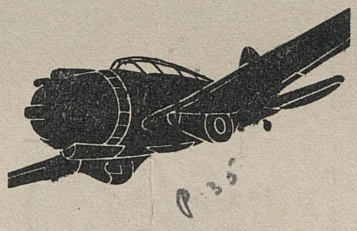
All "other" parts of a plane not included in wing, engine, fuselage, or tail that assist in its recognition should be described. The landing gear is the most important of these other characteristics.

Landing Gear

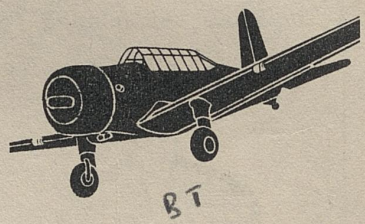
Since the landing gear is entirely retractable in most planes it is of little use as a recognition feature while the plane is in the air. Some planes have part or all of the landing gear fixed (non-retractable). Many planes have a non-retractable tail wheel or skid. It is difficult to distinguish at a distance retractable landing gear which is down, from landing gear which cannot be retracted. Special landing gear is designed for water (floats on seaplanes) and snow (skis).



Completely Retractable LG



Partly retractable wheels; tail wheel not retractable



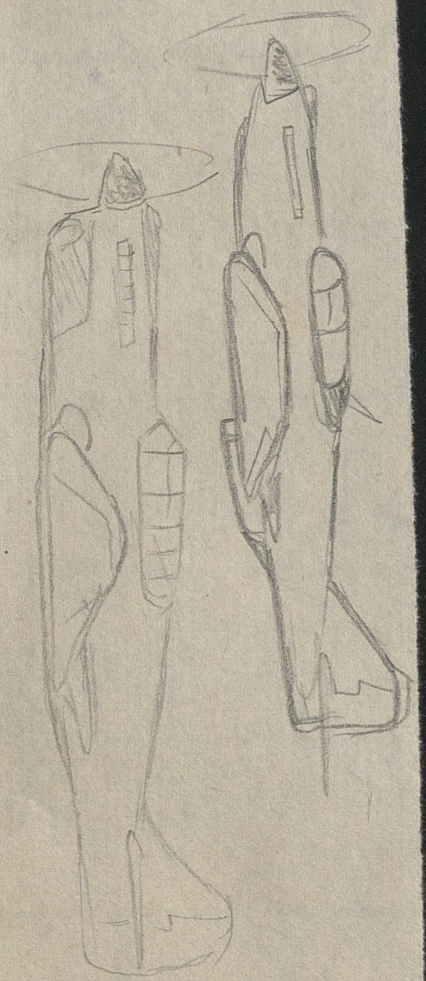
Fixed LG

Any other distinctive features or distinctive flight characteristics which tend to make recognition of a plane easier should be included here.

HOW TO USE THE SUCCEEDING PAGES

Drill yourself on the important recognition features by covering up the description and one or two views until you can recall what the features are and identify each plane from only one or two views. Only by constant review can you remember the differences among planes to be able to recognize them the instant you see them. Remember -- this may mean the difference between life and death!

S-47.95 — 70.75
S-48.7 — 66.65
S-41.9 — 66.8



~~270~~
2100

2745000
~~22~~ 100
~~6~~ 9.1000

820
4.4
~~824.4~~

2745 00
2400

2745
2.7
~~2747~~

830
1.6
31.6

~~815000~~
~~2400~~
~~817400~~

2730.5

2745
1.6
(46.6 – 30.3) .3
830.3
(31.6 – 34.5) 303

(31.6 – 34.5)

~~S40.45~~
S50.45 –
66.8 S53.6 – 71.4
S53.3 – 71.2

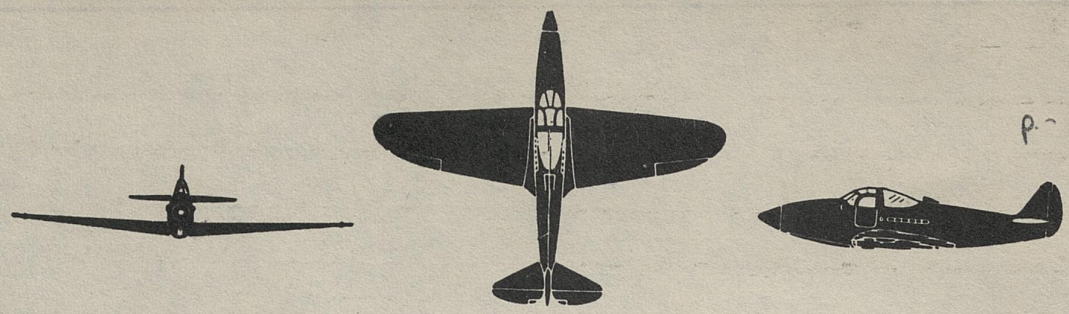
AIRPLANES

of the

UNITED STATES

ARMY and NAVY

1.



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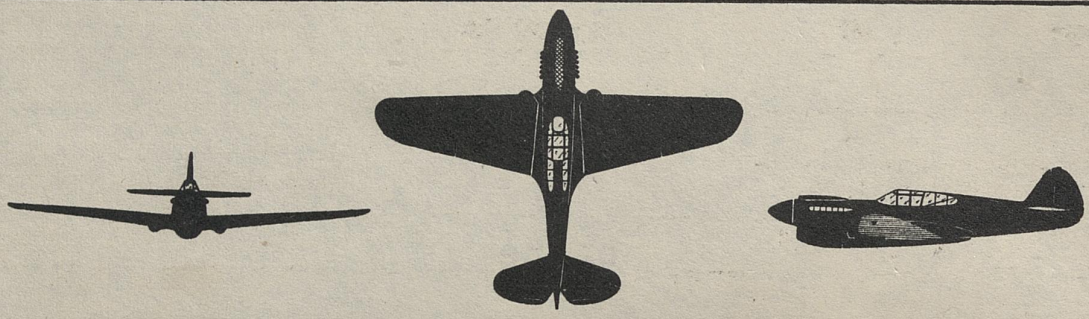

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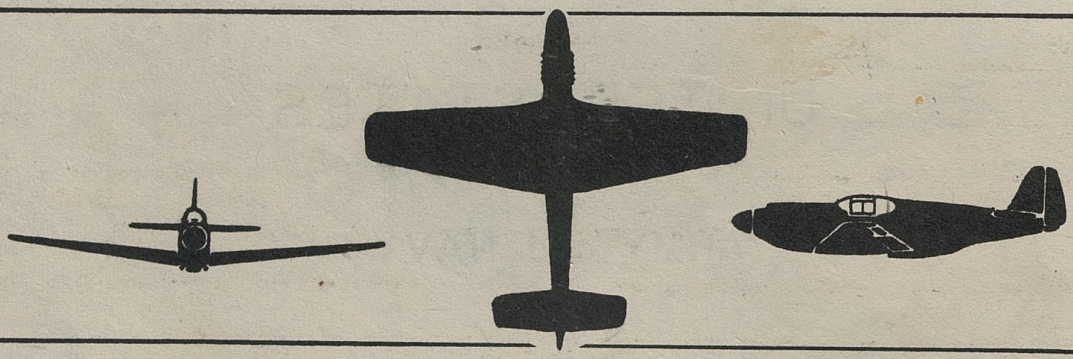

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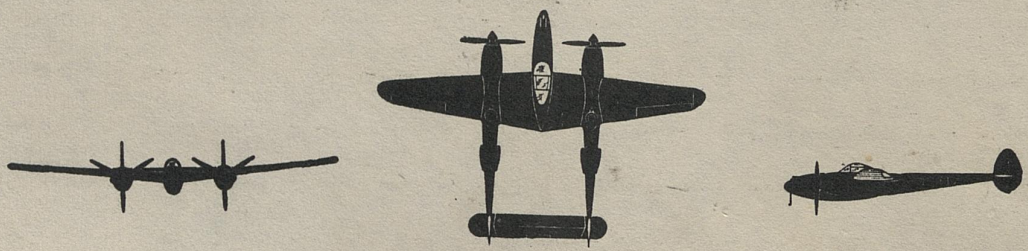


5.

Workbook

for

AIRCRAFT RECOGNITION

Introduction

Every pilot, bombardier, gunner, observer and navigator in an airplane must be able to distinguish a friendly plane from an enemy plane. More than that, it is necessary for the aircrew to distinguish every type of plane and know its chief performance characteristics so that they can assist friend and destroy foe. The recognition must be accurate and instantaneous. Serious is the error of false identification, and obvious is the consequence.

Both the aircrew and the ground support must be able to identify planes or they will be shooting down their own planes or delay firing on the enemy until it may be too late. Civilian Spotters, too, must be trained to forward accurate information to military authorities. It is obvious that for co-operation among all these agencies a thorough training is required, and to communicate efficiently, the training must be based on a uniform terminology.

This booklet contains materials for (1) learning a method of observing and describing in clear terms any new plane that may be seen, and (2) learning to recognize and call by name most of the commonly used planes of the Army and Navy of the United States. In later training the Student will be given instruction and drill in recognition of allied and axis planes. The Student should take good care of this booklet because he will need it for review as long as he is in the Army. The Student should be on the lookout for additional pictures and information about the planes included here. This extra material may be added to the workbook.

CLASSIFICATION OF AIRCRAFT

By "aircraft" we mean anything that man has constructed for flying, for example, balloons, airships, gliders, and planes. We are concerned here only with airplanes. Airplanes may be referred to either by stating what they are used for -- their mission (or purpose or function), or by describing how they are constructed -- their structure.

The Missions of Military Airplanes

The word "mission" is used to mean the particular job or jobs the plane was designed to perform. For example, a bomber is usually very fast, armored, contains defensive armament, and fitted to carry and release bombs, while a transport plane is slower, designed to carry personnel and equipment, and usually has no armor or guns. Yet, as the war develops and new needs arise, a plane originally designed for one job may be modified to perform another. A particular pursuit plane once designed and used for fighting may be used for observation and carry no guns at all. Thus, the mission of a plane may change greatly without its recognition characters changing at all.

Again, the construction may change as new features are developed while the mission remains the same.

Even though the mission of a plane is not always apparent by looking at the plane, it is necessary to know the chief use for which the plane is designed because it will be presumed to be on that mission in the absence of information to the contrary.

Classification of Military Airplanes on the Basis of their Primary Missions

A. Combat Missions (ordinarily armored)

1. Primarily for the destruction of enemy

a. Where the target is primarily other planes: pursuit

(1) Very rapid rate of climb to meet approaching enemy, short range--interceptors.

(2) Go out to protect bombers, or fight independently, longer range--fighters.

b. Where the target is primarily on the ground or surface of the sea; the chief offensive weapon of the air force: bombardment

(1) Light equipment and enemy personnel--attack or light bombers.

(2) Heavy installations, industries, etc.--medium and heavy bombers.

2. Primarily for the procurement of information (military intelligence)

a. Long range, high speed: reconnaissance.

b. Short range: observation.

B. Service Missions (ordinarily not armored)

1. Transport: Cargo or personnel (e.g. troop carriers)

2. Training

3. Behind-the-line communication (liaison)

The Structure of Military Airplanes

All airplanes are constructed on the same general plan and have certain essential basic parts. If airplanes were radically different from one another it would be relatively easy to learn to recognize each one by its special character. But there are only a few distinctive planes, hence it is necessary to adopt some systematic way of looking at a plane to be able to recognize it easily. The most commonly used system, and the one adopted here, is to observe and describe first the wings, then the engines, fuselage, tail, and other parts, (landing gear, or other features) in the order mentioned. The first letters of the names of these parts make up the key word WEFTO and the system is known as the Wefto System.

When you encounter a new plane do not merely glance at it, or even look at it for a long time in a haphazard way, but mentally break it down into its chief parts.

Each of these parts has a certain shape and arrangement with respect to other parts, thus the leading edge of the wing may be straight, curved, or tapered, the engine may be of in-line or radial design, and so on.

To establish a uniform terminology we shall define most of the terms used in aircraft recognition on the following pages.

(Note: Some other terms are used in various publications in place of those given here, and a few of the terms used here are used in slightly different ways in other places. This is unfortunate, but inevitable in a new and rapidly changing field. To help simplify the subject it is suggested that only the terms defined here be used. Other terms are included for reference only).

DESIGNATIONS OF AIRPLANES

All planes are known by nationality and number or name or both. Some planes are used by more than one nation or branch of the Service and thus have more than one designation.

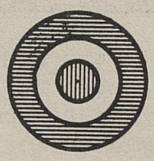
NATIONALITY

It is necessary to know the identifying insignia that appear on all military planes. These marks are on the wings, on the sides of the fuselage, and in some planes on the rudders. There is considerable variation in design and not all the designations are shown.



UNITED STATES

A white star on a circular blue field appears on the upper surface of the left wing and lower surface of right wing, and also on the sides of fuselage.



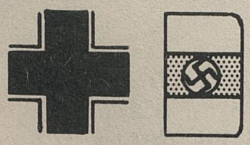
GREAT BRITIAN

Bull's eye appears on wings and fuselage. On wing, center dot is red, then a white ring, then a blue ring.



U.S.S.R.

A red star appears on wings and fuselage.



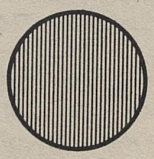
GERMANY

Black cross set in a cross-shaped white field that is in turn outlined in black on wings and fuselage. Swastika appears on the rudder.



ITALY

A circle inclosing three black fasces is used on wings and fuselage.



JAPAN

Solid red spot appears on both wings and fuselage.

DESIGNATIONS OF U. S. ARMY PLANES

The Army uses a letter to designate the primary mission or general type of plane and a number to designate the particular design or model accepted. The B-17, for example, is a bomber. B stands for Bomber; it was the 17th bomber design accepted by the Army, hence the number 17. Sometimes a letter follows the number, as B-17F. The F shows the series of this model. The B-17 has undergone a series of changes which are designated by letters following the model number, i.e., B-17A...B-17F. If a major improvement is made which radically affects the design and performance of the airplane, a new series number is assigned. The letter "X" is placed before the mission designation, to indicate that a new airplane is on trial and has not yet been approved for manufacture. The letter "Y" before the mission designation indicates the model is undergoing service tests. When the model is procured after it has been approved the "Y" is dropped. The prefix "Z" indicates that a model is obsolete.

Code letter	Mission or general type
P	Pursuit
A	Bombardment (light, attack)
B	Bombardment (medium and heavy)
O	Observation
OA	Observation-amphibian
F	Army Reconnaissance (photographic)
C	Transport (cargo)
PT	Training, primary
BT	Training, basic
AT	Training, advanced
BC	Basic combat
G	Autogiro
CG	Glider (cargo)
TG	Glider (training)
R	Rotary wing

DESIGNATIONS OF U. S. NAVY PLANES

The Navy designation includes a mission letter, a model number, and a letter indicating the name of the manufacturer. Sometimes a series number follows the letter indicating the manufacturer. For example, the F4F is a fighter, the 4th model made by the manufacturer accepted by the Navy, and the manufacturer is Grumman. When more than one mission is assigned to a U. S. Navy aircraft, the first letter indicates the primary mission and the second letter the secondary mission. A number following the letter designating the manufacturer shows that the plane is a later series of the model.

Code letter	Mission
F	Fighter
B	Bomber
S	Scout
P	Patrol
T	Torpedo
O	Observation
G	Transport, single engine
R	Transport, multi-engine
N	Trainer
J	General utility
H	Ambulance

COMBINATIONS

BF	Bomber-fighter
SB	Scout-bomber
SO	Scout-observation
OS	Observation-scout
PB	Patrol bomber
PT	Patrol torpedo
TB	Torpedo bomber
JR	Utility transport

MANUFACTURERS

A	Brewster
B	Boeing
C	Curtiss
D	Douglas
F	Grumman
M	Martin
U	Vought-Sikorsky
W	Waco
Y	Consolidated

Bell - L
Naman. - J
O - Lockheed
P - Spartan
S - Stearman

TYPES OF PLANES



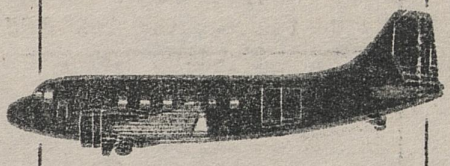
Pursuit P-40

Small, single engine (sometimes two), fast, maneuverable, slim.



Bomber B-24D

Larger than pursuit, two or four engines, fast, level flying, slim bodies, turrets visible.



C-47 Douglas

Transport

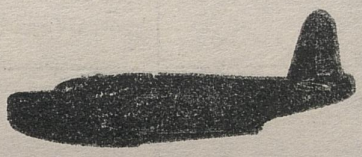
Thick bodied, large, 2 or 4 engines, windows frequently visible.



503C

Seaplane

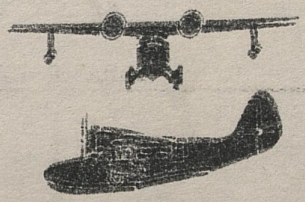
Like pursuit, may be larger for crew of 2 or 3. Landing gear consists of floats.



PB2Y2

Flying boat

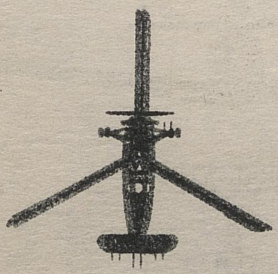
Body of plane is a hull.



F089

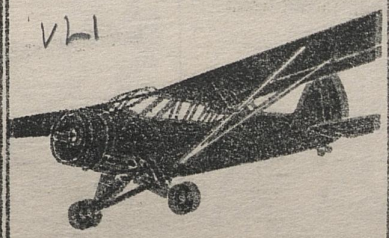
Amphibian

Flying boat with retractable wheels in addition to hull. May take off from land or water.



Autogiro

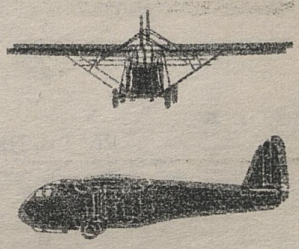
Rotating wing.



VL1

Liaison

Light plane, unarmed.



Glider

Motorless plane towed by aircraft.

WINGS

Wings are described by stating the number, position, angle with fuselage and shape

Number



One Wing: MONOPLANE



Two Wings: BIPLANE

Position



PARASOL WING



HIGH WING



MID WING



LOW WING

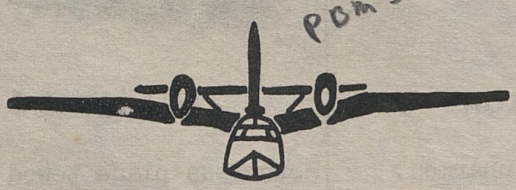
Angle



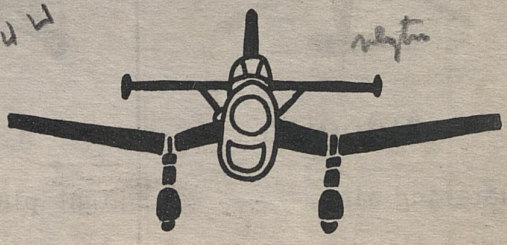
FLAT WING



DIHEDRAL WING



GULL WING

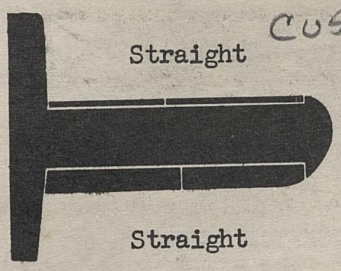


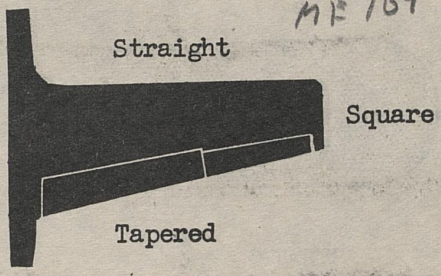
INVERTED GULL WING

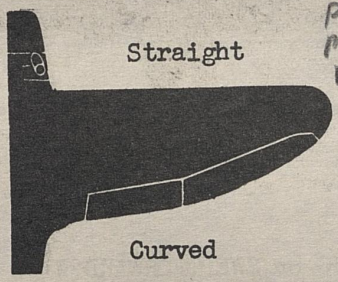
WINGS

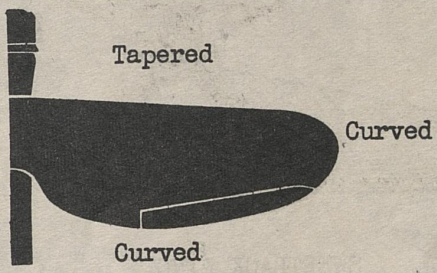
Shape

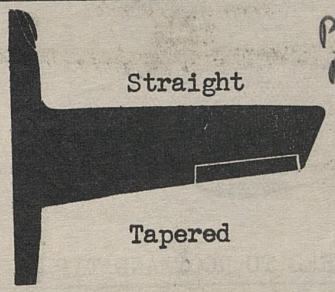
The shape of a wing as seen from above or below is conveniently described by three words in the following order: (1) Leading Edge (L.E.); (2) Trailing Edge (T.E.); and (3) Tip.

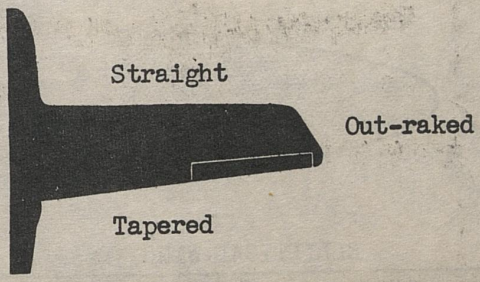




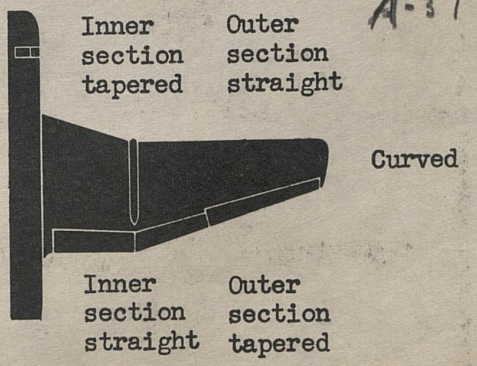






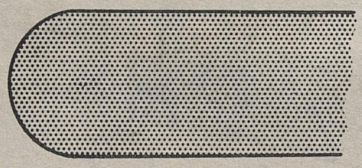


The inner section of a wing may be differently shaped than the outer section. In such a case, the inner section (L.E. and T.E.) is described first, then the outer section (L.E., T.E. and Tip), using the same terms as above.

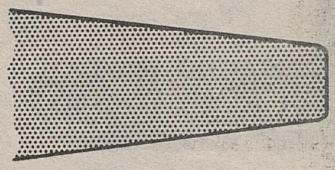


Alternate Wing-Descriptions

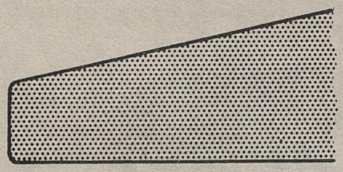
In some publications, the wing is described as shown by the examples below. These are included here for reference only.



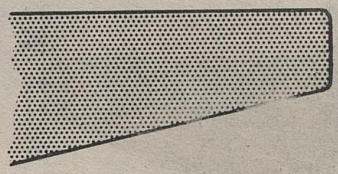
STRAIGHT WING



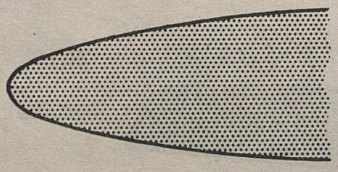
SWEPTBACK-TAPERED WING or "TRUE TAPER" WING



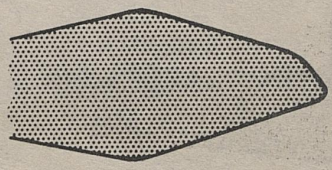
SWEPTBACK WING



TAPERED WING or SWEPTFORWARD WING



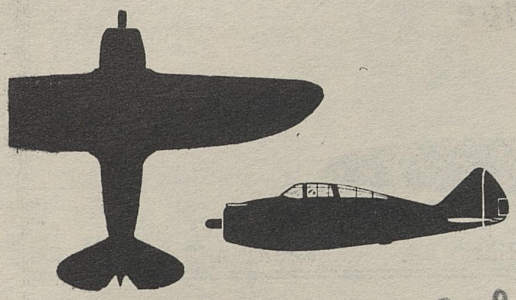
ELLIPTICAL WING



TAPERED TO ROOT AND TIP

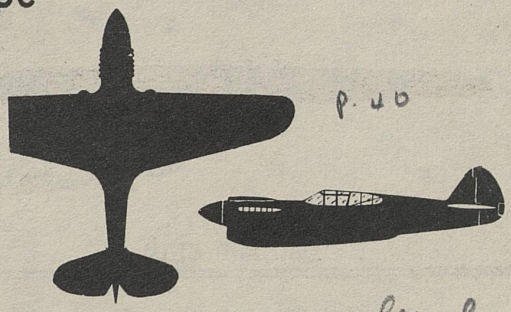
ENGINES

Type



RADIAL : air cool

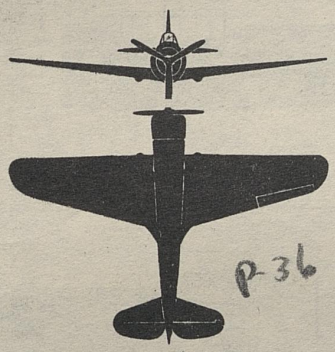
Blunt appearance. Usually air-cooled



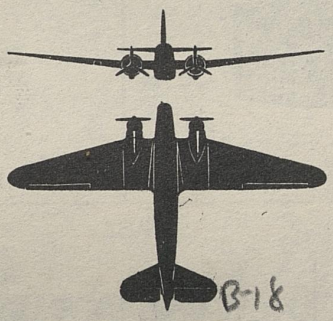
IN-LINE . liquid

Pointed appearance. Usually liquid-cooled.

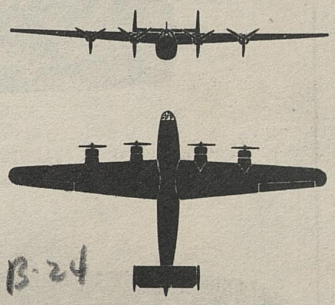
Number



ONE



TWO



FOUR

Position



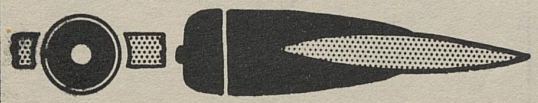
OVERSLUNG

Engine mounted on top surface of wing.



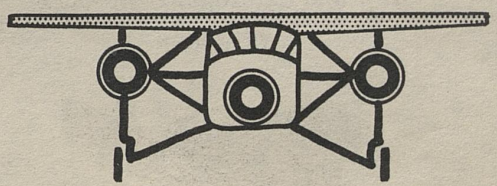
OVERWING

Engine supported above wing



CENTERED or MIDSLUNG

Engine mounted in the wing



UNDERWING

Engine supported below wing



UNDERSLUNG

Engine mounted on bottom surface of wing.

FUSELAGE

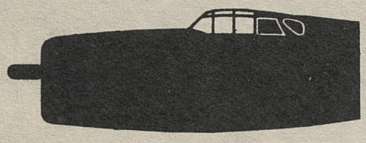
Shape



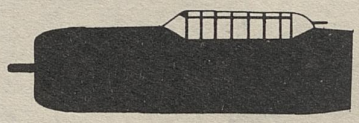
LONG AND SLIM | MEDIUM | SHORT AND STUBBY

Breaks in Outline

COCKPIT ENCLOSURE

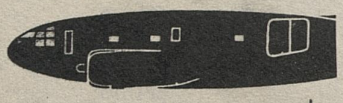


Abrupt fore, blends aft; short



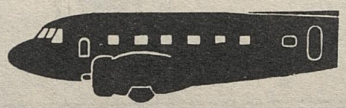
Abrupt fore, abrupt aft; long

NOSE



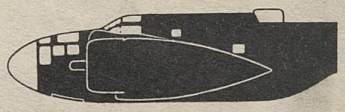
C-46

Rounded



C-39

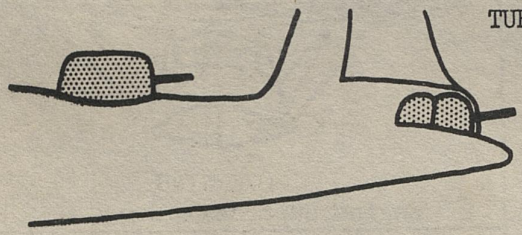
Broken or one-step nose



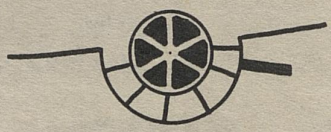
A-30

Transparent nose

TURRET



Top and "stinger" in tail



Belly

AIR SCOOP



P-40

6810

BLISTER



Notice → (RESTRICTED) Keep out

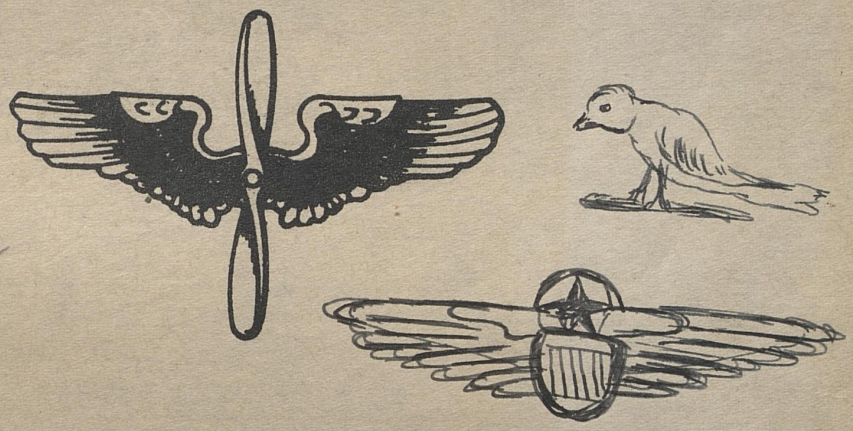
George W Canary Jr.
Group IV Sq D.1C 43-H

ACADEMIC DEPARTMENT

ARMY AIR FORCES PREFLIGHT SCHOOL (PILOT)

SAN ANTONIO AVIATION CADET CENTER

GEO. CANARY



SAN ANTONIO, TEXAS

15113242

RECOGNITION OF AIRCRAFT

Pg (8)

SECOND AIR FORCE INTELLIGENCE SCHOOL
EIGHTEENTH REPLACEMENT WING
ARMY AIR BASE, SALT LAKE CITY, UTAH

MESSAGE SAMPLE

IM V PY NR2
a. b. c. d.

Z GOWENFLDAAB IDAHO Ø5143ZZ P GR9
e. f. g. h. i.

COAB TOPEKA KANS
j. k.

GF J 129 A STOP REQUEST INFORMATION BE FORWARDED RE TRANSFER OFFICE
l. m. n.
EQUIPMENT YOUR BASE CITE LETTER THIS HQ DEC ONE ONE FORTY TWO

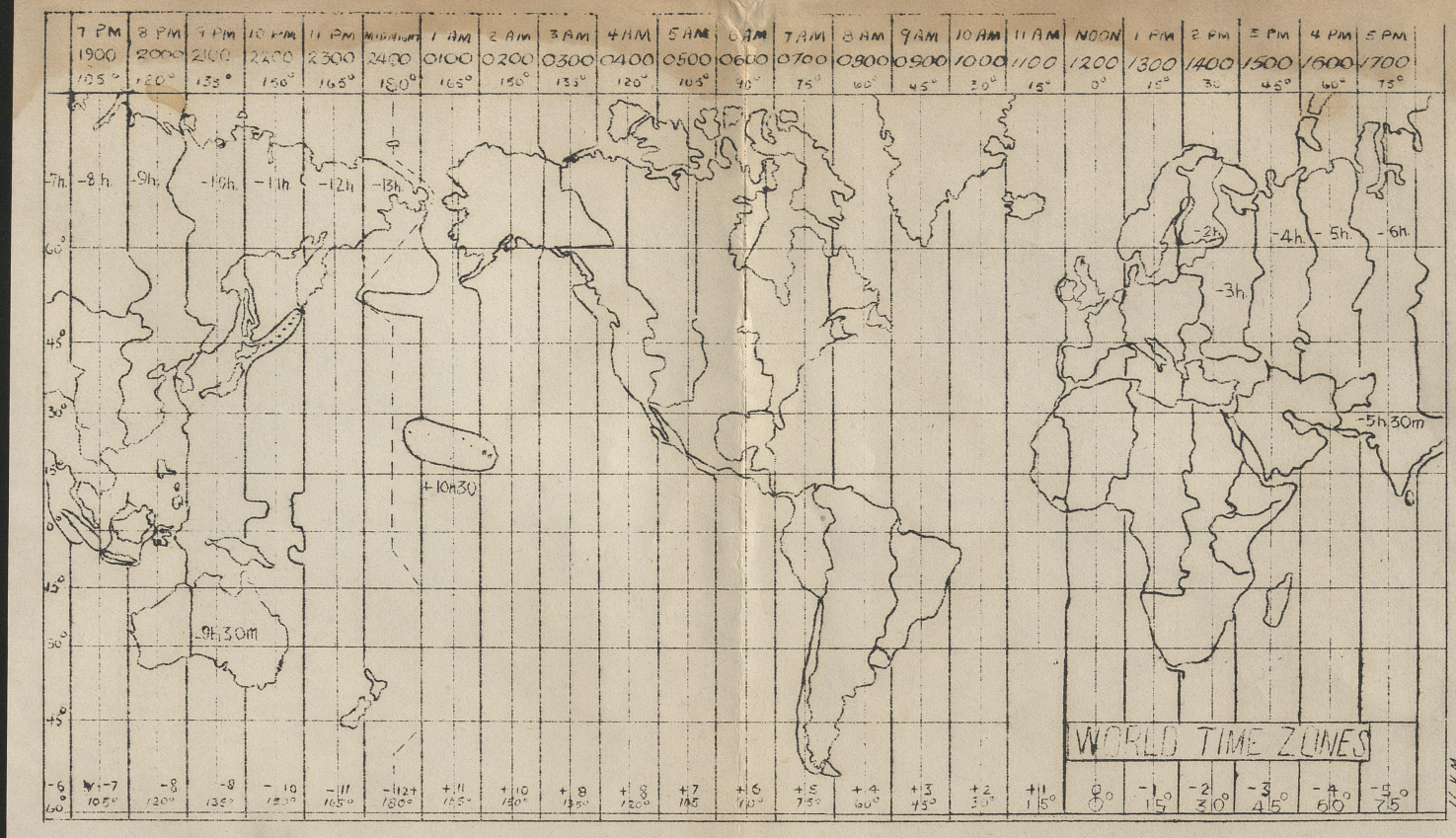
LEEBURN GOWENFLDAAB
o.

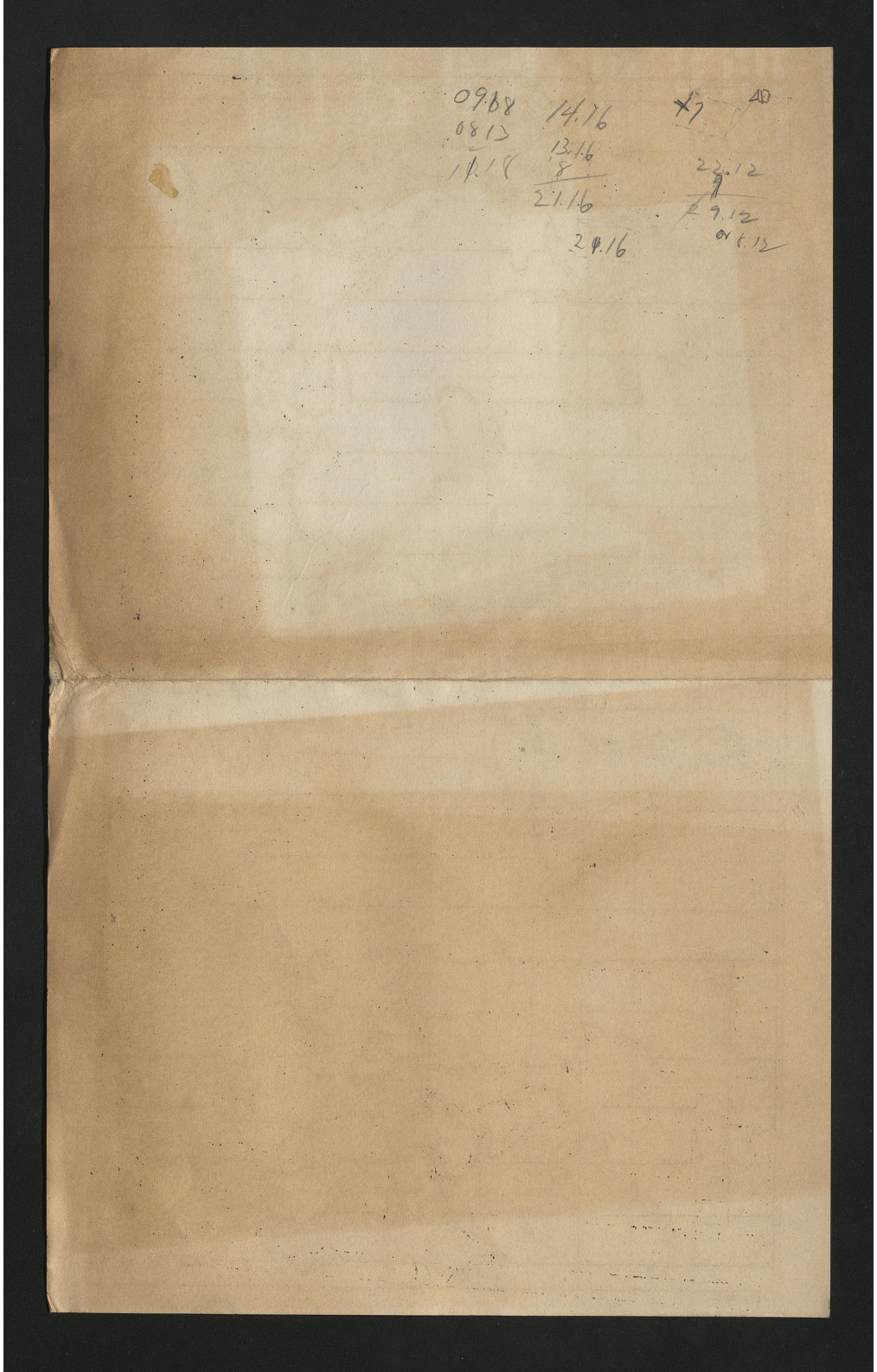
Y
p.
PY V IM R NR2 N Ø5145ØZ
c. b. a. q. d. r. s.

DESCRIPTION

a. Called Station
b. Prosine "From"
c. Calling Station
d. Serial Number
e. Prosine "Originator Follows"
f. Address Originator
g. Date Time Group Sent
h. Precedence
i. Group Count
j. Addressee
k. Address
l. Abbreviation for Address of Writer
m. Month Symbol
n. Writer Symbol
o. Signature
p. Prosine "Acknowledge"
q. Prosine "Received"
r. Operator's Sign
s. Date Time Group Received
l., m. and n., Message Reference Number

23VA


7 PM 1900 105°
8 PM 2000 120°
9 PM 2100 135°
10 PM 2200 150°
11 PM 2300 165°
MIDNIGHT 2400 180°
1 AM 0100 165°
2 AM 0200 150°
3 AM 0300 135°
4 AM 0400 120°
5 AM 0500 105°
6 AM 0600 90°
7 AM 0700 75°
8 AM 0800 60°
9 AM 0900 45°
10 AM 1000 30°
11 AM 1100 15°
NOON 1200 0°
1 PM 1300 15°
2 PM 1400 30°
3 PM 1500 45°
4 PM 1600 60°
5 PM 1700 75°
-8 h.
-9h.
-10h.
-11h.
-12h
-13h
-4h.
-5h.
-6h.
-2h
-3h
-5h 30m
+10h30
-9h30m
WORLD TIME ZONES
-7 105°
-8 120°
-8 135°
-10 150°
-11 165°
-12+ 180°
+11 165°
+10 150°
+9 135°
+8 120°
+7 105
+6 90°
+5 75°
+4 60°
+3 45°
+2 30°
+1 15°
0 0°
-1 15°
-2 30°
-3 45°
-4 60°
-5 75°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F - DIT DIT DAH DIT
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RESTRICTED

SECOND AIR FORCE INTELLIGENCE SCHOOL
EIGHTEENTH REPLACEMENT WING
ARMY AIR BASE, SALT LAKE CITY, UTAH

MOTION PICTURE PROJECTION

The intelligence training program of the Second Air Force requires frequent use of training films and other motion pictures, so it is essential that intelligence personnel be familiar with the use of projection equipment.

The information contained on the following pages deals with the Type 3-class B-projector (16 mm silent and sound) manufactured by the Bell and Howell Co. It is intended to serve as a guide to proper use of this equipment by personnel of intelligence sections.

This material has been extracted from Technical Order No. 10-20-16, a restricted publication, and must be handled in accordance with this classification.

Only such matter as relates to operations, inspection, maintenance and lubrication, and service troubles and remedies has been included. Additional information, and pictures and sketches illustrating the material and operations described on these pages can be obtained by referring to TO 10-20-16.

The 16 mm projector is a self-contained projector, with sound head, amplifier and speaker. These items are mounted in two fabrikoid covered plywood cases.

Special wiring hookups and switches allow the mechanism to operate at sound speed, 24 frames per second and silent speed, 16 frames per second.

Another switch allows the mechanism to be reversed.

A clutch allows the mechanism to be stopped for close scrutiny of a single frame.

A microphone input system allows the use of a microphone or phonograph turntable.

In addition, intelligence personnel should familiarize themselves with the operations of the Balloptican for opaque projections.

RESTRICTED

SECTION IV

OPERATION

1. General

The mechanism of the projector is equipped with still picture clutch, a sound-silent speed switch and a reverse switch, permitting the film to be run forward or backward without rethreading. The projector is equipped with a 2 inch F1.6 lens as well as the light increasing Magnilite condenser. The speaker case will hold a 2000-foot reel and can.

2. Pre-use

The removable reel arms are carried inside the projector case on the door. Attach the one marked "top" at the top front and the one marked rear at the upper rear of the projector case. Both are fastened by thumb screws accessible when the large door is opened.

Loop the rear spring belt, without a twist, from the drive pulley at the rear of the projector motor, to the take-up pulley at the end of the rear reel arm. Loop the front belt, without a twist, over the small pulley at the top of the feed reel arm.

3. Cautions before pre-use.

The line into which you are connecting your projector is A,C.

The voltage rating for your location is not higher than 125 volts.

The fuse in the power line is rated at least 15 amperes, provided no other equipment is on the same circuit.

If other devices are connected to the same circuit, the house fuses should be replaced by spare plug type fuses of 20 or 25 ampere rating.

All controls on the projector are in "off" position.

4. Electrical connection.

After removing the speaker grill cover and all accessories from the speaker case, carry the speaker and the speaker cable to the front of the room. Place the speaker as nearly as possible at the center of the screen and above the floor, but not so high as to interfere with the picture. Locate the speaker at least 18 inches in front of any obstructing surface.

Connect the polarized female end of the speaker cable into the receptacle plug on the speaker chassis.

Uncoil the speaker cable as you go toward the projector. Avoid placing the cable where the audience might trip over it.

Insert the end of the speaker cable marked "speaker" into projector.

Insert the plugs on the two short branches of the "Y" cord into the receptacles on the projector.

Connect the attachment plug at the end of the "Y" line cord into a wall receptacle providing 115-volt 50 to 60 alternating current. If the receptacle is more distant add a 10 foot line extension cord to the end of the "Y" cord, then attach the extension cord to the power outlet.

5. Adjusting the projector to the screen.

The small case door in front of the projection lens must be opened. Turn on the projector switch, and the lamp switch. If the electrical connections are correctly made, the projector mechanism should now operate and a beam of light should be projected on the screen, provided that the clutch control is turned to the extreme clockwise position.

Move the projector on its stand or table to such a position that the projected beam coincides with the screen. The projector is raised to the required height by turning the front of the projector and is accessible through the front lower small door.

If the projected image is larger than the screen, move the projector closer.

If the image is too small, move the projector farther from the screen.

If the room size limits the throw, select the correct lens.

With the projector operating and the lamp turned on, loosen lens locking screw by turning to the left, and slide the lens forward or backward until the outlines of the aperture or frame are sharply defined. To further sharpen the focus, revolve the lens first in one direction, then in the other.

Turn off the projector and turn on the amplifier switch. Allow about one minute for the tubes to heat, then move the film control in a clockwise direction until a hiss is heard in the speaker. At the same time, light should be seen from behind the exciter lamp cover.

If the above conditions exist, the electrical connections are properly made, and the projector is ready for threading.

6. Threading the film

Place the projector test reel, supplied with the projector, on the top reel arm spindle and an empty "take-up" reel on the rear spindle. Press each of these reels firmly on the spindle until the small retaining spring-balls lock the reels on the spindles. Pull off about four feet of leader film for threading.

The film, if correctly wound, should feed from the front of the reel with the perforated edge toward the operator.

Slip the film into the slot at the base of the reel arm and between the two rollers. Lead the film above roller and below sprocket. Slide the film as far toward the machine as it will go. Holding the film firmly, press on the tab to open the guard. Pull gently on the film until the perforations seat over the sprocket teeth. Then release tab, locking the film on the sprocket.

Swing lever upward. This movement will open the film gate. Form the first loop, following the loop outline on the side of the gear case. Pass the film through the channel behind the lens being certain that it is fully seated in this channel. Then close the gate by pressing down lever as far as it will go. Form the second loop, conforming to the outline on the gear case and slip the film over the second sprocket. Again press the film as far toward the projector as it will go, and while maintaining correct loop size, lock the film. Turn the hand setting knob several clockwise revolutions. This will engage the film with the shuttle teeth. Should the lower loop slide upward, open the gate and reset the loop to the outline on the gear case. After closing the gate, again test the threading with the hand-setting knob.

Lead the film from under the second sprocket, under the top roller of the oscillatory stabilizer, around the sound drum and over the third sprocket. Press the film as far toward the projector as it will go over the sprocket and pull down on the film as it passes over this sprocket. When the Oscillatory Stabilizer is moved to its extreme position by the tension on the film, open the film guard by pressing on the tab. Then, free the film just sufficiently to permit the Oscillatory Stabilizer to pull it back to the first available set of perforations. Release the tab, permitting the guard to lock the film in place on the third sprocket.

Pass the film under the snubber and the roller and thence to the take up reel. The film must be inserted in the slot, in the case and between the rollers on its path to the take-up reel.

Remove the film slack before starting the projector, by revolving the take-up reel clockwise.

No special precautions need to be observed to synchronize the sound to the picture since adherence to the foregoing instructions will assure correct synchronization.

The mechanism on the rear reel arm is a combination take-up and re-wind device. Set this for take-up by pressing lever while the reel is on the spindle.

No adjustment or compensation is necessary for various reel sizes, since the flat fabric belt between pulleys provides complete and automatic compensation without any manual adjustments. The projector is now ready for operation.

7. Pre-check

The aperture, gate plate, and optical components must be clean.

All loops must be correct size.

The film must be properly engaged on all sprockets.

The film gate must be closed.

The film must be properly started on the take-up reel, with all slack removed.

The take-up rewind assembly must be set to take up film.

The direction switch must be set for forward operation.

The correct speed must be selected for the film you are projecting.

Current 115 volt 50- to 60-cycle alternating current to be used.

Test the threading by turning the hand set knob or by momentarily turning on the motor.

When using projecting sound film, the amplifier must be turned on.

When using microphone with silent film, check the amplifier if turned on.

Check the film volume control, it must be in its extreme low position.

8. Projecting

With the amplifier tubes warmed and the film volume control about one-quarter on, start the projector using switch. Immediately after the motor has started, turn on the lamp switch.

As the title appears on the screen, carefully revolve the lens in one direction or the other until the title or the first picture appears in sharp focus. Lock in focus with screw.

9. Framing

If the picture frame line shows on the screen, turn the framer knob, to make the frame line disappear. If framing moves the picture off the screen, readjust the tilt control.

10. Sound volume and tone control

The film volume control knob may now be advanced or retarded. The volume control operates quite similarly to volume controls on radio sets and either full volume, to the limit of the amplifier, or minimum volume for the smallest room may be achieved.

The tone control is also operated similarly to a tone control on a radio receiver. This control should be set by the operator for the most desirable reproduction at each showing.

The test reel should now be projected in its entirety. The operator should run this practice film until he becomes thoroughly familiar with every phase of operation and threading.

As "the end" title appears on the screen, the operator should turn off the projector lamp and, as the end of the narration or music is reached, the film volume control should be reduced until no sound is heard. The remaining "trailer" of film should be permitted to run completely through the machine.

11. Projecting silent film.

To project silent film, thread the machine in the usual way. Set the speed control switch at "silent". Do not turn on the amplifier unless oral comments are to be made through the speaker by means of a microphone or musical accompaniment is to be reproduced by means of a turntable. When so using the amplifier, be certain that the film volume control is at its extreme minimum volume position.

12. Still picture projection.

To project a still picture, the clutch control knob is revolved to a full counterclockwise position, thus disengaging the projector mechanism. If no picture appears on the screen, the closed section of the shutter is obscuring the light. A small movement of the handsetting knob will bring the open section of the shutter into correct position, thus permitting the projection of single frames of film. It will be necessary to adjust the lens to focus a still picture. Refocus when motion is resumed.

13. Reversing.

Turn the volume control until the sound is inaudible. Stop the film by either disengaging the clutch or by stopping the projector motor. When the mechanism has stopped, turn the direction switch to "reverse". Before changing direction always stop the projector. The lamp may be on or off, as desired.

14. Rewinding

The take-up reel, which has now received the entire film, should be removed from its spindle on the rear or take-up reel arm. The empty reel should be removed from the top reel arm, and the two reels interchanged.

The end of the film is led over the top of the empty reel. The lever is pressed forward, and the take-up reel lifted up as far as it will go to engage the two rewind gears. Then, while still holding the reel in the lifted position, the pressure should be released from the lever, thus locking the assembly in the rewind position. Turn the projector switch on, allowing the motor to run until all of the film has been rewound on the original reel. To save wear on the mechanism, it is suggested that the clutch be disengaged by turning the knob to its full counterclockwise position.

Immediately after rewinding, and before removing the loaded reel, again press lever, thus restoring the assembly to the take-up position. CAUTION: No twisting, changing, or removing of any belt is necessary when rewinding or taking up film.

15. Microphone

A microphone may be used with this project. A high-grade crystal microphone or high impedance dynamic microphone should be used.

The microphone jack is accessible through an opening in the front of the projector base. The lower front door of the projector case must be opened. A separate microphone volume control is provided.

16. Phonograph turntables or transcription players.

Two different types of turntables or transcription players are available. The single speed type runs only at 78 r.p.m., while the transcription player may be used at either 33-1/3 or 78 r.p.m. depending upon the type or recording to be reproduced. The former turntables used a needle in the pick-up arm, while the Bell and Howell transcription player uses a permanent sapphire stylus.

However, any phonograph turntable with a sapphire stylus, crystal pick-up or a high impedance magnetic pick-up arm may be used. The jack is plugged into the microphone receptacle and the volume is controlled, by a knob which is installed on the turntable itself.

17. Pilot light

The pilot light is identified by the chrome plated disc cap mounted on top of the projector casting above the Magnilite condenser. To operate the pilot light, pull the cap forward; to turn it off, push back. The pilot light should always be off when the projector is in operation.

To replace the lamp, turn the chrome plated cap counterclockwise until it may be removed from the assembly, insert the new lamp and reassemble.

18. Operating on 25-cycle 115-volt A.C.

A A special amplifier is required for operation on 25-cycle alternating current of less than 50 cycles.

Do not attempt to use the 50-60-cycle amplifier on such lines.
The special 25-60-cycle amplifier, when installed in the projector, may be operated on any 115-volt alternating current having a frequency between 25 and 60 cycle inclusive.

19. Operating on 115-volt direct current.

For projectors that are to be operated on direct current a high quality D.C. to A.C. converter having a capacity of 100 watts is needed for the amplifier only.
The projector motor and lamp operate from the direct-current line. One side of the "Y" cord is plugged into the converter while the other is connected to the projector receptacle. The A.C. output of the converter is connected to the amplifier receptacle. When these connections have been made, the operation is the same as for A.C.

20. Operating on 220-volt 50- to 60-cycle alternating current.

To operate on 220-volt alternating current, a 1500-watt, 220-volt to 115-volt transformer is required. Plug the 220-volt side into the A.C. outlet. Then run the projector "Y" cord from the 115-volt side of the transformer to the projector power receptacles as for normal operation.

21. Operating on 220-volt direct current.

A special 130-250-volt adjustable rheostat is available for use on 220-volt, or varying, direct current lines. This is really two rheostats combined into one. Into one output side is plugged the projector power cable, while into the other output side may be plugged a 115-volt D.C. to A.C. converter. The input side of the rheostat is adjustable and may be accurately determined by means of the voltmeter with which the rheostat is equipped. Special rheostat operating instructions are furnished with each of these units.
CAUTION: When operating on 220-volt D.C., control the projector mechanism and lamp with the motor switch only! The lamp switch should always be in the "ON" position! Use a 750-watt lamp only! If a lamp burns out or the showing is over, shut off the projector with the motor switch.

SECTION V--ACCESSORIES

1. No special accessories, other than those furnished with the projector are necessary.
2. Supplementary projection lenses of different focal lengths are recommended if screen sizes and projection distances vary with the location where the equipment is being used.
3. If direct current (D.C.) is encountered, a converter of either the vibrator or rotary type, of at least 100 watts capacity, will be needed for the amplifier.

4. Extra speaker extension cables are useful where long "throws" are encountered. These cables are available in 50-foot lengths, Specify serial number of projector when ordering.
5. A minumum of one 750-watt projector lamp, an exciter lamp, a box of 2-ampere fuses and a complete set of amplifier tubes should be carried as "spares" at all times.

SECTION VI

INSPECTION, MAINTENANCE AND LUBRICATION

1. Inspection and maintenance

a. Cleaning optical parts.

Before every show, and at any other time that appears necessary, the projection lens and aperture should be cleaned.

The projection lens as well as the 45-50 condenser lens and the Magnilite condenser, on projectors equipped with this device, must be kept scrupulously clean and free from dirt and oil. For cleaning, use lens cleaning tissue.

The projector lens is removed by pulling forward on the lens barrel [illegible] and rear lens elements are then accessible for cleaning. If only a slight amount of dust has accumulated on these lenses, use lens cleaning tissue to remove the dust. If, however, finger prints, oil, grease or other accumulations of dirt are present, lens cleaning fluid should be wiped on the lens surface and followed by a thorough cleaning with lens cleaning tissue.

The same treatment should be given the Magnilite condenser and the main 45-50 condenser lens.

The 45-50 condenser and the Magnilite condenser are removed from the projector by pulling on the holder handles. They should be cleaned frequently with the same materials as used for the lens.

CAUTION: Don't attempt to remove or adjust the lens of the sound optical system. This requires special training and equipment. This lens, with one face exposed within the exciter lamp compartment and the other exposed toward the sound drum, should be cleaned occasionally. The mirror, which can be seen by looking down behind the sound drum from in front of and above the projector, should also be cleaned occasionally.

Remove the exciter lamp compartment cover, by the same methods employed to replace the exciter lamp. This is described in paragraph c of this section.

Both ends of the lens of the sound optical system should then be cleaned with lens cleaning tissue wrapped around the end of a toothpick, as should the mirror, already described.

b. Cleaning film handling parts

The aperture should be cleaned by removing the lens from its carrier and, after removing the gate shoe, insert the aperture brush, supplied with the projector, through the opening, carefully brushing all sides and corners of the aperture. To remove the gate shoe, grasp the metal frame and withdraw. Use no tools! Clean and polish shoe with a soft cloth. To avoid scratching polished surface, use no sharp tools.

Replace it being sure that the tines are guided to the grooves formed by the metal plate attached to the back of the lens casting. A click will be heard when the metal frame is correctly positioned.

Before replacing the shoe, the film channel should be cleaned by drawing a clean lintless cloth through it. The gate must be open and the machine not running.

c. Exciter lamp replacement

The exciter lamp is beneath a three-sided metal cover at the front right-hand corner of projector base. Unscrew the thumb nut and remove the cover of the exciter lamp compartment. Press the lamp down, turn it counterclockwise slightly, and lift it out. It is not necessary to loosen the set screw which holds the exciter lamp socket in place. After a new exciter lamp is installed and before it is lighted, wipe it to remove all finger marks. An extra exciter lamp is provided with each projector.

Ordinarily, no adjustment is required when an exciter lamp is replaced. However, if the filament is not in line with the inscribed mark directly behind the lamp, loosen the two set screws on the socket. Carefully move the lamp up or down, so that on sighting directly across the top of the filament, the inscribed line, immediately to the rear of the exciter lamp, and the filament coincide. Care must be taken not to revolve the lamp. Only a turn or two is necessary to loosen the two screws. They should be retightened just enough to hold the socket securely.

d. Fuse replacement

A 2-ampere fuse is provided in the amplifier. It should be checked immediately if the exciter lamp fails to light. The fuse will burn out if direct current is fed into the amplifier supply receptacle.

Always disconnect the line cords before removing the fuse. Unscrew the red insert marked "FUSE", for inspection. Never replace with a fuse larger than the 2-ampere size.

e. Projector lamp replacement.

To replace a projector lamp, unscrew the cap at the bottom of the lamphouse and allow the lamp to slide out into the hands.

If a projector lamp is being replaced during a show, be careful as the lamp slides down to grasp it by the relatively cool centering ring. This operation should be performed quickly, since a moment or two after the lamp is disengaged from the socket, the centering ring, acting as a cooling flange, becomes quite warm.

Insert the new lamp with the vertical tongue on the centering ring toward the front of the projector and revolve it slightly one way or the other until the tongue settles into the centering slot in the bottom of the lamphouse.

Replace the screw cap, making sure that it screws in squarely and tightly to lock the lamp in proper position.

Never attempt to change a lamp with the current on.

Since the lamps are designed to burn base down, the machine must not be turned upside down or laid on its side while the lamp is burning.

f. Reflector

The reflector No. 03864 is permanently adjusted at the factory and no further adjustments should be attempted. Occasionally it is desirable to polish this reflector in the same manner as the projection lens or the Magnilite condenser, as prescribed in section VI, par. a. The reflector is removed by turning the holder counterclockwise. Polish carefully and replace.

2. Lubrication.

a. Wherever oil is specified, S.A.E. No. 20 should be used.

The addition of oil, at a few places provided is a simple but very important part of projector operation. Proper oiling will assure a long trouble free life. A lack of oil will result in serious damage.

To saturate the felts within the sprocket shafts, have the projector disconnected from the line and speaker and lay it on its side. Insert the tip of the oil can into the holes and squeeze the sides of the oil can about three times.

b. Once after every 100 hours of operation the snubber rollers should receive one drop of oil on their shafts. Wipe off excess oil from shafts and rollers.

c. Once every 100 hours of operation the rollers on the front and rear reel arm holders should receive one drop of oil. Wipe off excess oil from shafts and rollers.

d. Wherever grease is specified, A.A.F. Spec. 3560, grease, high melting point, or equal should be used.

Grease may be added after each 100 hours of operation. It need be replaced only when the assembly lubricated has been dismantled for inspection or repair.

Grease, other than for retaining parts during assembly, is required only in the governor cap and reel arms.

T. O. No. 10-20-16, Section VII

SERVICE TROUBLES AND REMEDIES

Troubles	Causes	Remedies
1. Projection will not operate.	1. Current supply cords not making proper contact.	1. Check source of supply and cable.
2. No sound	1. Exciter lamp burnt out.	1. Replace.
	2. Amplifier not turned on.	2. Check amplifier switch
	3. Fuse blow out.	3. Replace
	4. Defective tubes in amplifier.	4. Test and replace
	5. Speaker cable not connected at both ends.	5. Check connections.
	6. Tubes in amplifier not making proper contact.	6. Check tubes in sockets and clean tube prongs.
	7. Volume control not properly set.	7. Advance to "high" position.
	8. Film incorrectly threaded	8. Check threading.
	9. Grid clip not attached to top of 6 J7 tubes.	9. Check all tube contacts
	10. Absence of sound record on film.	10. Turn volume control to high position pass card swiftly back and forth between sound lens and drum. If a loud "thumping" sound is heard from the speaker the projectors sound mechanism is operating properly. Lack of sound is then due to film.
	11. Defective tubes	11. Test and replace.
	12. Exciter lamp lead wires not connected.	12. Connect.
3. Inadequate volume	1. Dirty film	1. Check with practice reel.
	2. Dirt or oil obstructing sound optical system.	2. Clean thoroughly
	3. Defective, dirty or poorly adjusted exciter lamp.	3. See section VI Par. 1
	4. Low line voltage	4. Check line source.

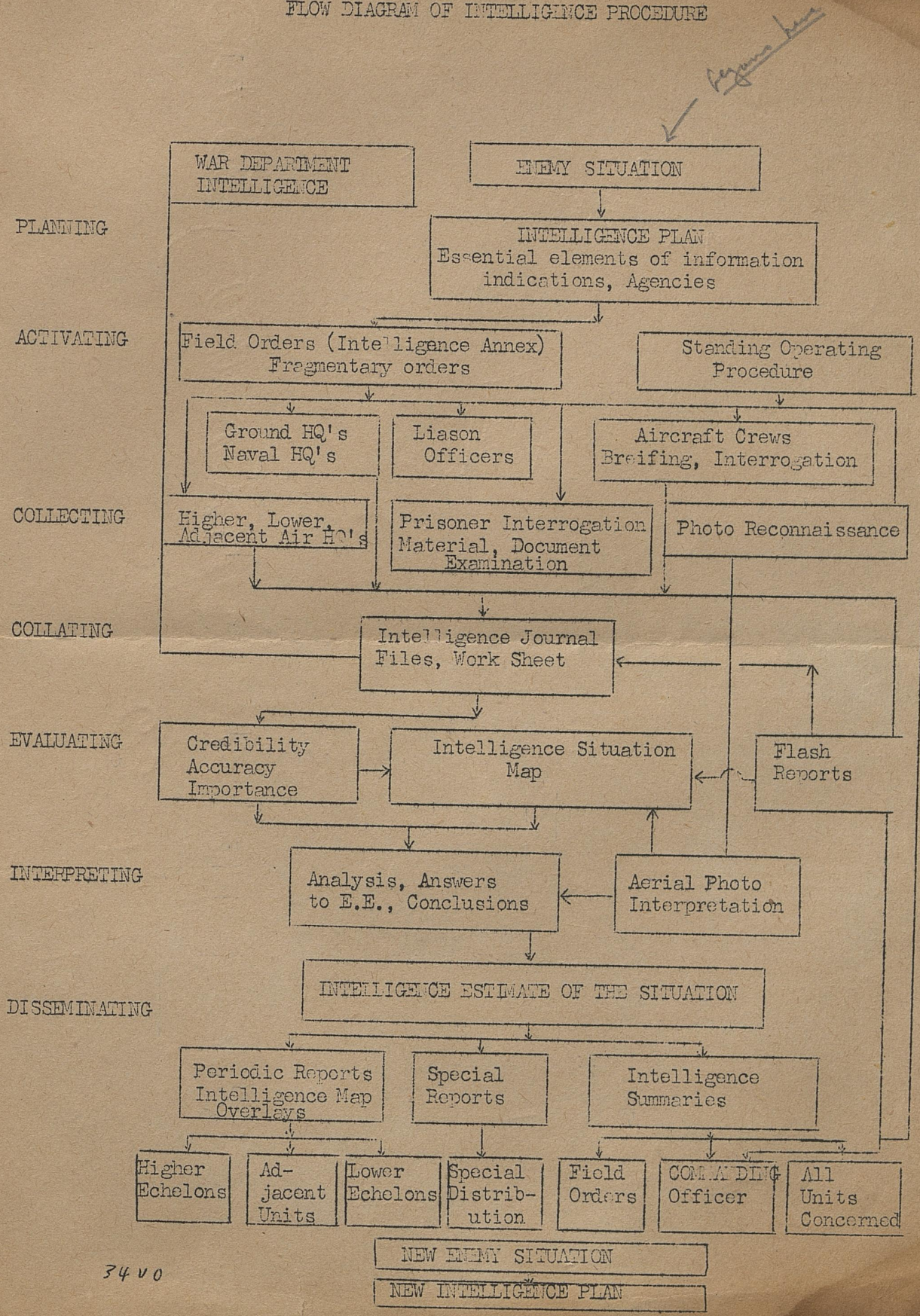
Troubles	Causes	Remedies
4. Unsatisfactory sound quality.	1. Speed switch set in silent position. 2. Defective tubes	1. Put in proper position. 2. Test and replace
5. No picture.	1. Power supply cord not properly connected. 2. Lamp switch off. Projector lamp burnt out. 3. Projection lens door closed	1. Check connections 2. Check position, replace. 3. Open
6. Insufficient brilliancy	1. Extraneous light falling on screen. 2. Blackened projector lamp 3. Dirty projection lens, condenser or lamp.	1. Check light sources 2. Replace 3. Clean as directed in section VI, Par. 1



ARMY AIR BASE
SALT LAKE CITY, UTAH

F-7 SAFIS

FLOW DIAGRAM OF INTELLIGENCE PROCEDURE



3400

George Canary Jr.

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Pvt George W Canary Jr

SECOND AIR FORCE INTELLIGENCE SCHOOL
EIGHTEENTH REPLACEMENT WING
ARMY AIR BASE, SALT LAKE CITY, UTAH

WHAT IS WRONG WITH THE FOLLOWING LETTER? Assume that a clerk in your section has written the following letter and you are turning it back to him with instruction to correct the errors in form, spacing, etc. Use notes on the letter to indicate what you consider to be wrong.

Consider this line represents the top of the paper.

THIRTY FOURTH BOMBARDMENT GROUP (H)
Office of the COMMANDING OFFICER
Pendleton field, Oregon April 11, 1942

To: Commanding General, Second Air Force, Fort George Wright, Wash.
Subject: Assignment of additional intelligence personnel.

1. Transfer of Captain Richard P. Roe, S-2 of the Thirty-fourth Bombardment Group (H), to Westover Field, has left the group without the services of an intelligence officer. Lack of officer personnel prevents the assignment of anyone in the group to this office on a full time scale.
2. Advice as to the availability of an additional officer for such assignment is requested.

By order of the Commanding Officer
John Doe
1st Lt, AC
Adjutant

-1-

3¢

1. Skip 7 spaces
2. Should be small letters
3. " " " "
4. Headquarters
5. Should be placed on left above date
6. Skip two spaces
7. Field - F to be Capitalized
8. Period
9. IN refer to and file no (2 spaces skip)
10. Two places down
11. Spelt out in full
12. Skip 2 spaces
13. Commanding and assignment should be alined
14. Important part Capitalized
15. Skip two spaces.
16. Name initials of writer and typist
17. Indent five and alined with subject
18. In Capitals all wrong
19. Skip two spaces.
20. Indent alined with subject
21. For the Commanding Officer
22. Should be over to the left
23. Skip 4 spaces
24. Written out
25. " "
26. Comma
27. Comma

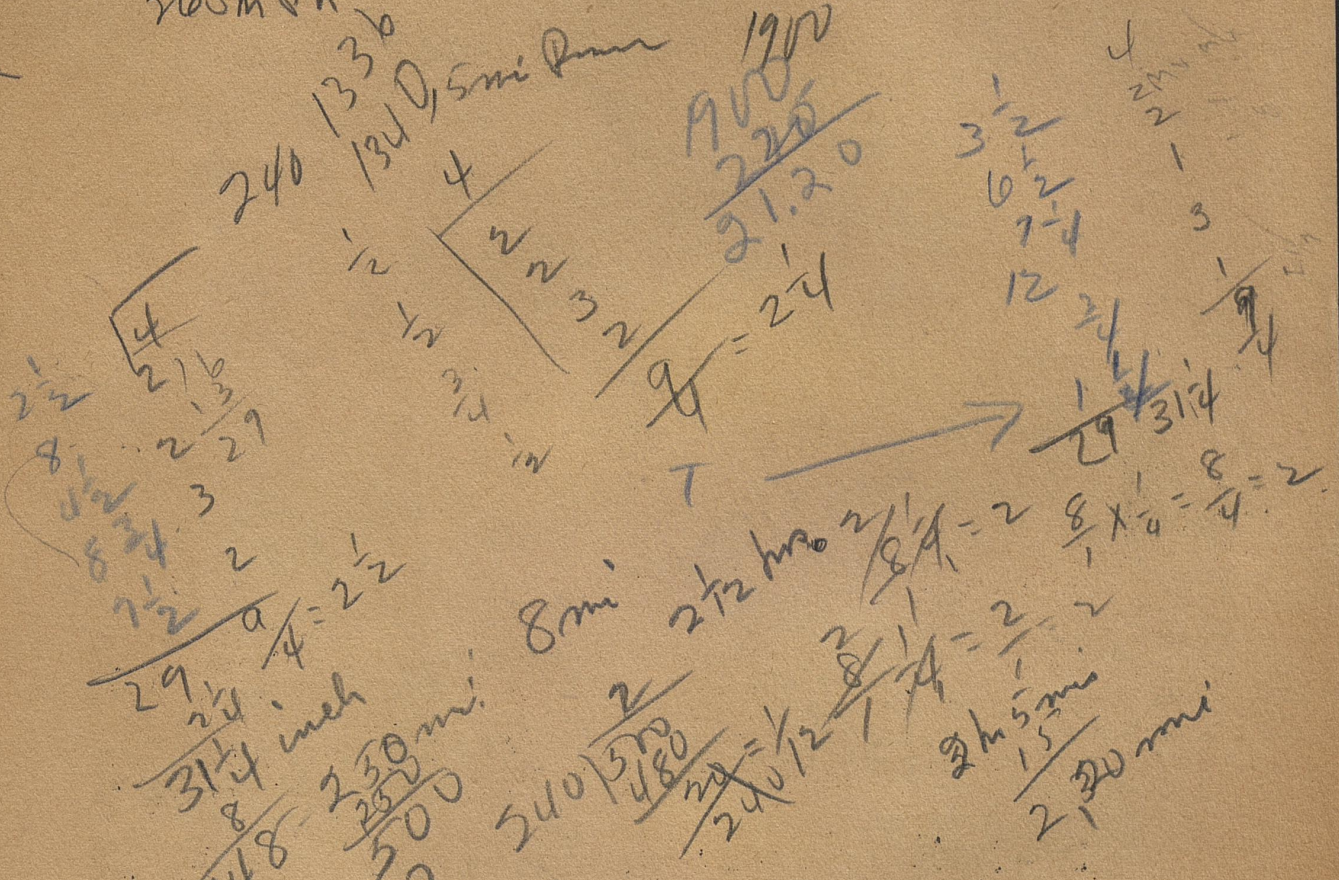
(28) Period

(29) period after organs

(30) A.C. Spelt out in full

(31) Semi Colours

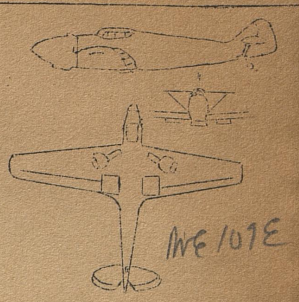
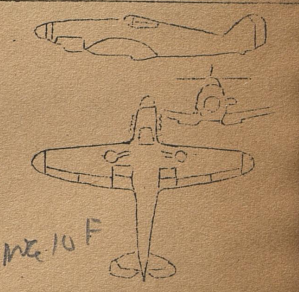
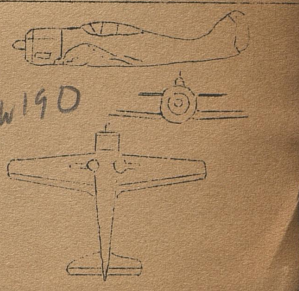
(32) John Doe in Caps

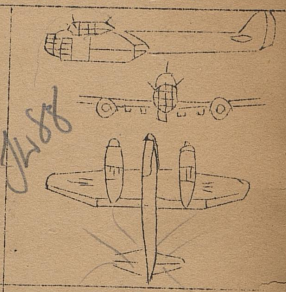
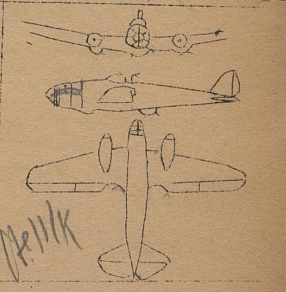
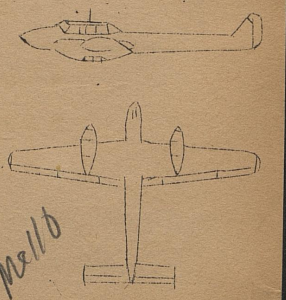


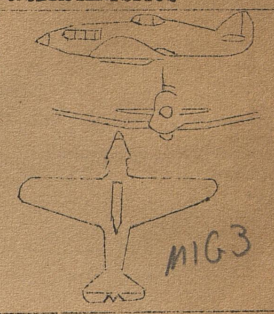
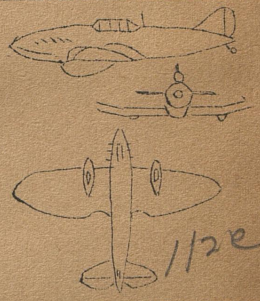
(33) Should be recorded in better style.

(34) Should be centered

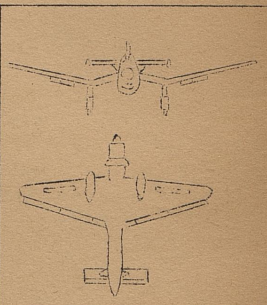
(35) 1 - should be at bottom of page

PLANE	WEFTUR SYSTEM	CHARACTERISTICS
Me 109E (German) Fighter	W - Low, tapered trailing edge, dihedral. Squared tips. Span 32' 5". E - 1 inline, liquid cooled. F - Streamlined, long & slender with curved top and bottom. Length 28' 3". T - Monoplane type, rounded tailplane set far forward, equally swept back & has tail struts. U - Retractable. R - 3 large square one under nose, plus one on each side of fuselage below wing.	
Me 109F (German) Fighter	W - Low, tapered trailing edge, dihedral, round tips. Span 32' 5". E - One in line, liquid cooled. F - Streamlined. Long & slender with curved top and bottom. Length 28' 3". T - Monoplane type, rounded tailplane, set far forward, equally swept back & tapered. No tail struts. U - Retractable. R - Three. Large square air scoop under nose, plus one on each side of fuselage below wing.	
FW 190 (German) Fighter	W - Low, slight dihedral, slight sweepback, marked taper. Round tips. Span 34' 5". E - One radial, extending well forward of leading edge. Very large spinner. F - Long, with small cockpit and very sharp taper to tail. Length 28' 11". T - Monoplane type. Angled fin and rudder, swept back tail plane with rounded tips. U - Retractable. R - One small, above engine cowling.	

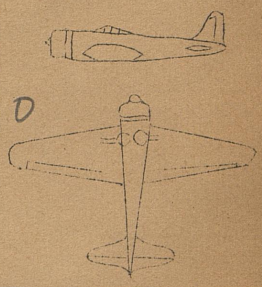
PLANE	WEFTUR SYSTEM	CHARACTERISTICS
Ju 88 (German) Dive Bomber	W - Low, with straight center section, sweep-back & taper outboard. Span 59' E - 2 Radial. Nacelles extend far forward & back to trailing edge. F - Snul-nosed, Nose heavy in appearance, pilot enclosure forward of wing. Off-center bomb bay. Length 46' T - Monoplane type, equal sweep-back & taper on tailplane set far forward. U - Retractable. R -	 Ju 88
He 111K (German) Bomber (H)	W - Low, rounded leading edge, cutout in trailing edge. Slight dihedral. Span 76 '. E - 2 in line, set into wing. Pointed nacelles. T - High rounded fin & rudders with a cut at fuselage. Elliptical tailplane. U - Retractable. R - Large rounded air scoop under each nacelle.	 He 111K
Me 110 (German) Fighter	W - Low. Equally swept-back & tapered. Square tips. Span 55' E - 2 inline, set into wing. Pointed nacelles. F - Long, narrow. Large pilot enclosure directly above wing. Length 40'6". T - 2 rounded fins & rudders. Rectangular tailplane with square tips. U - Retractable. R -	 Me 110

PLANE	WEFTUR SYSTEM	CHARACTERISTICS
Mig 3 (Russian) Fighter	W - Low, straight leading edge, marked taper, round tips. Faired into fuselage. Span 37' 6" E - Single, inline. Thick profile, exposed exhaust stacks, long top line. F - Wide, stubby, with small canopy for back. Length 31' 2". T - Retractable. U - Monoplane type, with narrow triangular fin and rudder, Swept back, rounded tail plane. R - One, long & narrow, under fuselage.	 MIG3
IL2C (Russian) Stormovik	W - Low, swept back & tapered to almost round tips. Cut-outs in trailing at fuselage. Span E - 1 inline, exposed exhaust stacks, long top line. F - Evenly tapered from nose to tail. Cockpit rises high from fuselage. Length T - Monoplane type. High rounded fin & rudder. Swept back & tapered tailplane U - Wheels retract into large streamlined wells. R - Under engines nose.	 IL2R

NOTES

	WEETUR SYSTEM	CHARACTERISTICS
Ju 87 (German) Stuka Dive Bomber	W - Mid, inverted gull wing. Swept back and tapered. Span 45' 4". E - One, inline. Long nose. F - Very long, tapers from nose to tail. Large cockpit. Length 35' 6". T - Monoplane type, tapered fin. Straight rudder. Wide rectangular tailplane. U - Dual, fixed, with streamlined wheel pants. R - One large rounded, below engine.	

NOTES

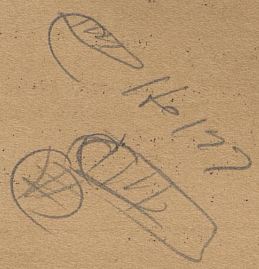
PLANE	WEFTUR SYSTEM	CHARACTERISTICS
Mitsubishi 97 (Japan) Bomber (H)	W - Low mid. Equally swept-back & tapered. Marked dihedral. Span - 72'. E - 2 radial, set into wing & far forward. F - Cigar shaped, but with bombadiers, pilots and observers enclosures taking 3 distinct steps on top. Length - 47'. T - High, rounded fin & rudder. Tailplane equally swept-back & tapered. U - Retractable. R -	
Mitsubishi 00 (Japan) Zero Fighter	W - Low, equally swept-back & tapered to round tips. Span - 40'. E - 1 radial & round nacelle. F - Round, long & thin. Small pilot enclosure. Length - 28'. T - Monoplane type. Triangular fin and rudder with broad base. Equally swept-back & tapered tailplane. U - Retractable R -	

Jug O is light bi rate Climb extreme mean.

1/2 C heavy arms

He 111 K - Tail bumbs out

He 177



F. VIII

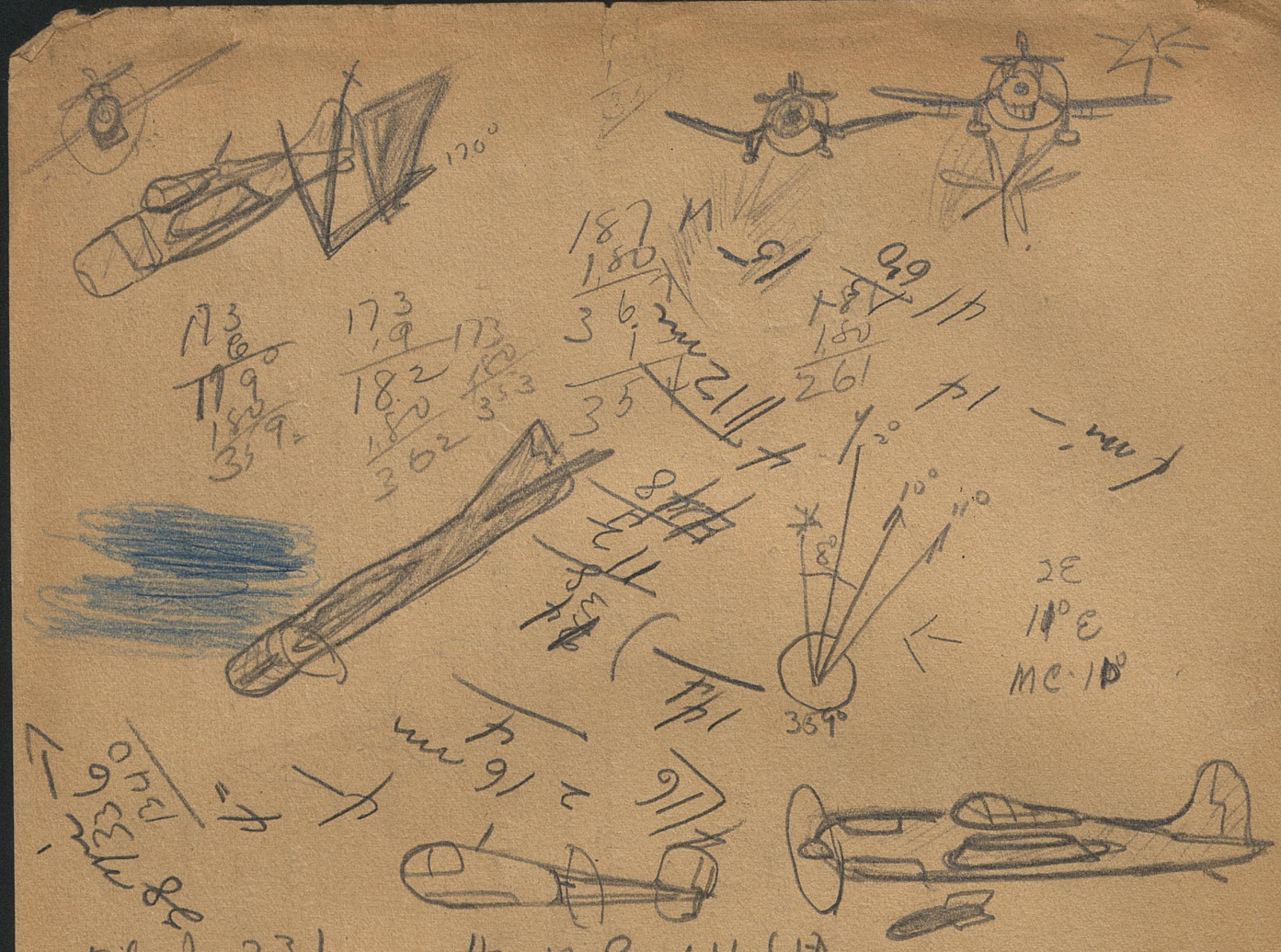
G-2 JOURNAL 96th Bomb Gp (H)

ORGANIZATION

	Date	Hour
From	5/1/43	1200
To	5/8/43	1200
Place	A.A.B.	JAVA

TIME IN	TIME OUT	SERIAL NUMBER	TIME DATED	INCIDENTS, MESSAGES, ORDERS, ETC.	ACTION TAKEN
01/1400		1	01-1000	TWX-Co 4 Bmd WG (H) reference Bomb Miss Tokio 5-1-43 2100/01	Co, S3 - file
01/1600		2	01-1200	TWX 2 Co 4 Bmd WG (H) ref TWX 1 01/1000 Bmb Miss T.E. Set 02/0100	Co, S3 - file
	01-1700	3	01-1700	TWX 50 Co 5 Fighter Cmd Miniola Phillipheneis req. Fi. escort	
				Bmb Miss Tokio 02/0100	Co, G, file
01-1715		4	01	TP 15 ND US Figh Pla. down ocean 45°S 180°W 30'	Co 17 ND file
	01-1716	5	01-1716	TP Co 17 ND PK up Surv Fght pl 45°S 180°W 30'	Co 17 ND file
02-0600		6	02-0500	Radi Co 96 Bmb Grp (H) Tokio Cmp destr Lag sit in hd	file
0830		1	0845	TWX RAF Bomb Cmd new dummy	
				airdrom has just been installed	
				south West Maarick at 51°3'N 5°40E	
0855		2	0840	Conf letter Bomber Com. recent attempt made Sabotage Aircraft by	
				tampering with other system & landing gear increase Jerrcanvies	
				measures to be adopted immediately	

4 VM



File No 33.1

Hq 17 Bomb W (H)
H H F
Flow Wright Spokane Wash

To: Commanding Gen 2nd Bombe Com. Ft Geo Wm
Spokane Wash.

Com 2 → JET

adjutant John Jones

Date	Recd		
1345	1350	Radio Sect. B	Gneisenau Major adjutant 17 Wing

Moved during night

Camouflage merchant vessel substituted 51°58 30 N
4° 8' E

Pvt. George W. Canary Jr.
15113242

AIRCRAFT IDENTIFICATION

WEFTUR SYSTEM

Although a newcomer to the field of aircraft identification might be confused by the apparent similarity of all airplanes, he will soon find a key to the successful identification of the various warplanes. This simple but effective key consists of nothing more or less than several definite identification factors whose application in recognition of planes will facilitate an accurate and automatic identification of a particular plane. Indeed, a knowledge and practical application of these identification factors will enable the individual to recognize a plane instantaneously by its individual characteristics and collective appearance. A plane, like a person, has its own "personality" and individual idiosyncracies which a good observer can eventually detect by recognizing the whole make-up or "collective appearance" rather than the individual traits. In considering airplanes, a careful study of the individual characteristics of each type will gradually enable the observer to arrive at a similar recognition by grasping the identity of the combined features that distinguish the plane under observation from all others.

Identification factors in connection with combat aircraft vary according to the individual applying them. Students, however, should initiate their observation and study of combat aircraft by following the W E F T U R system of aircraft identification analyzing its component identification factors.

SECOND AIR FORCE INTELLIGENCE SCHOOL
EIGHTEENTH REPLACEMENT WING
ARMY AIR BASE, SALT LAKE CITY, UTAH

SECOND AIR FORCE INTELLIGENCE SCHOOL
EIGHTEENTH REPLACEMENT WING
ARMY AIR BASE, SALT LAKE CITY, UTAH

AIRCRAFT IDENTIFICATION

The course in Aircraft Identification consists of 15 hours spaced over the period of three weeks.

The assignment for the course is to be thoroughly familiar with the following forty-two aircraft.

UNITED STATES

B-17E	A-24	P-39	TBF
B-24	A-29	P-40	SB2C
B-25	A-31	P-47	F4F
B-26	Vultee Vengeance	P-51	F4U
A-20	P-38	TBF	PBY

GREAT BRITAIN

Stirling	Lancaster	Wellington	Hurricane
Halifax	Manchester	Beaufighter	Spitfire

GERMANY

FW-200	JU-88	ME-109E and F
HE-177	HE-111k	FW-190
DO-217	ME-110	JU-87

RUSSIA

I-18 (MIG-3) IL-2 (Stormovik

JAPAN

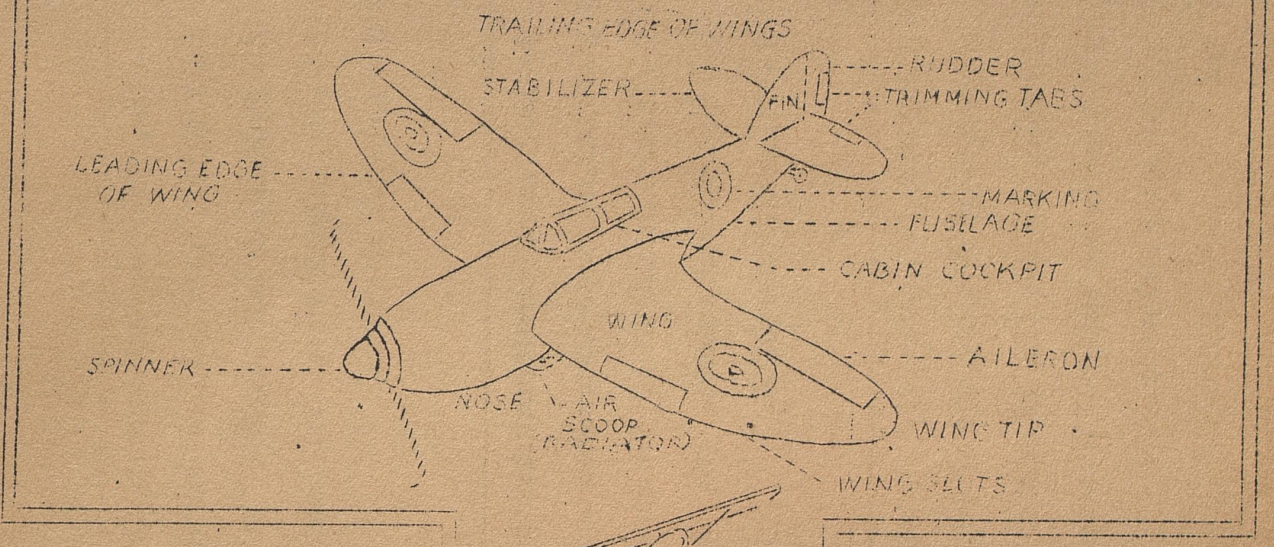
Nakajima 97 (known also as T-19 heavy bomber) Zero

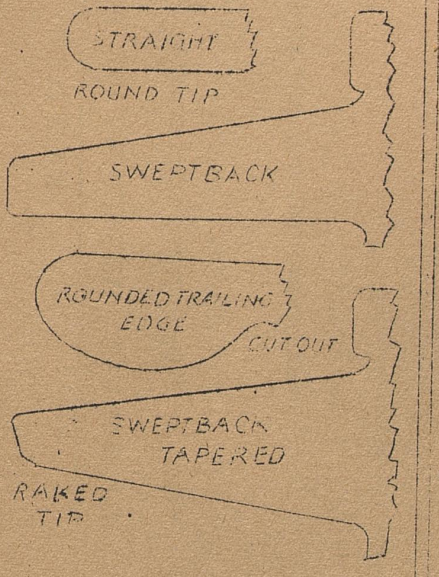
Field Manuals FM 30-30 and FM 30-31 will be used. "The Aircraft Spotter" is also helpful.

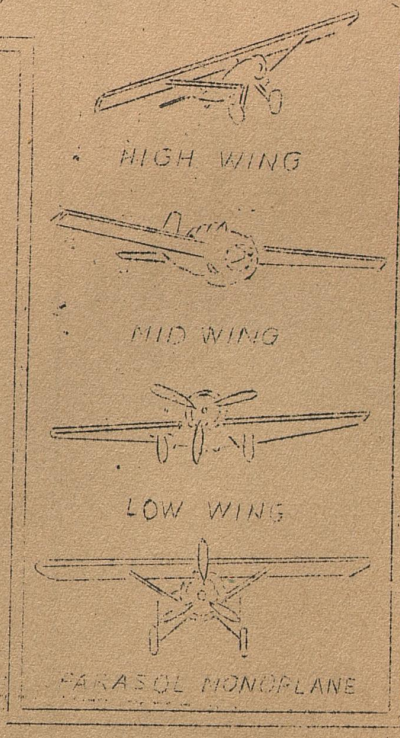
In addition to the above, a daily VOLUNTARY problem of identification will be given at a spot near the north door of the classroom in building T-22.

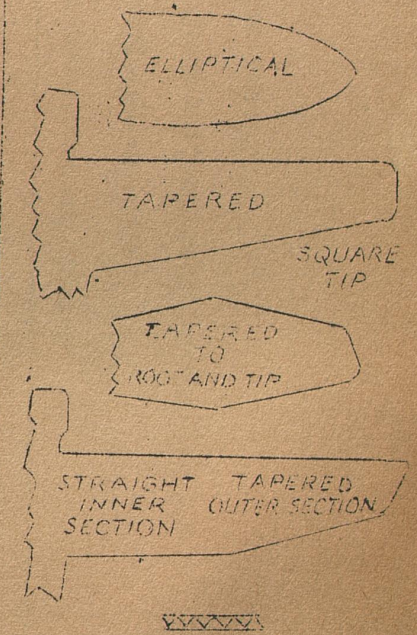
3 VD

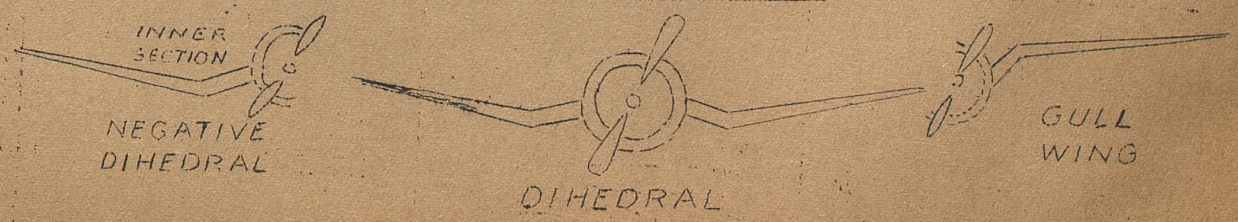
NOMENCLATURE OF AIRPLANE PARTS

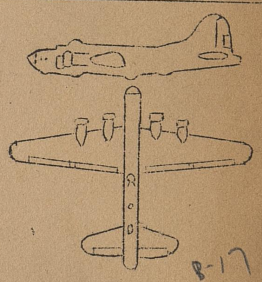
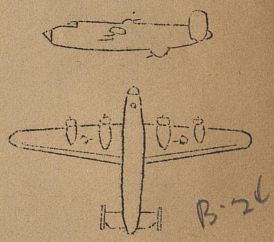
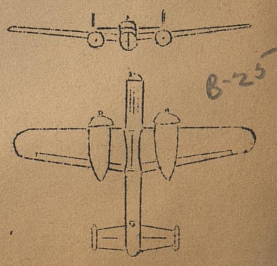


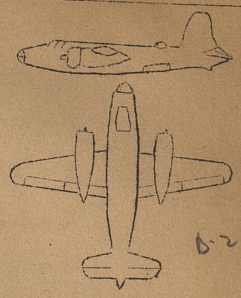
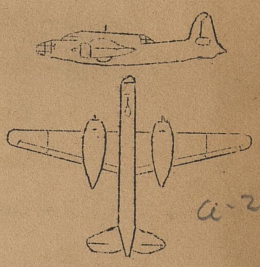
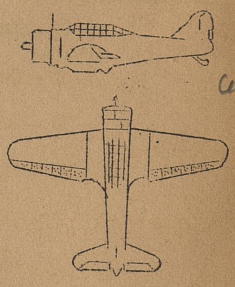


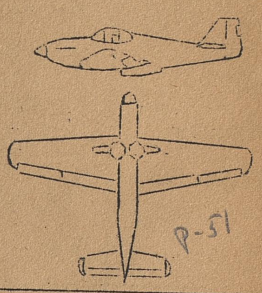
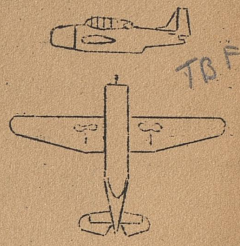
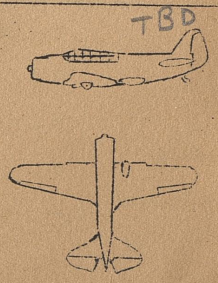




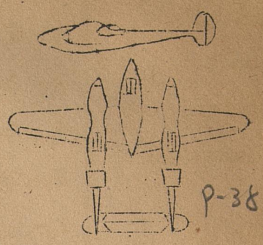
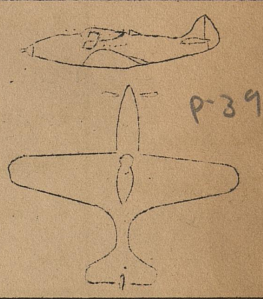
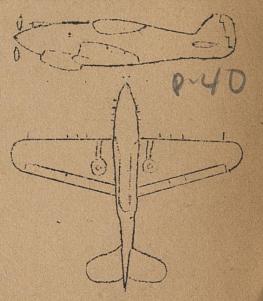


PLANE	WEFTUR SYSTEM	CHARACTERISTICS
B-17E Fortress Bomber (H)	W - Low, swept back and tapered. Round tips and dihedral. Span 103' 9". E - 4 Radial, inset nacelles and well forward from leading edge of wing. F - Streamlined, with length of 73' 10". T - Long, sloping dorsal fin. Swept-back and tapered elevators. U - Tricycle, retractable. R -	
B-24 Liberator Bomber (H)	W - Long, equally swept back and tapered. Span 110'. E - 4 Radials, underslung nacelles and well forward from wing. F - High, wide and thick. Has straight sides. Length 63'. T - Twin fins and rudders. Oval vertical fins. U - Tricycle, retractable. R -	
B-25 Mitchell Bomber (M)	W - Hi-mid wing, semi-gull. Equally swept back and tapered. E - 2 Radial, extending aft of trailing edge of wing. F - Long, slender, wing at center. Round nose and tail. Length 51' 5". T - Twin fin and rudders. Rectangular shaped. U - Tricycle, retractable. R -	

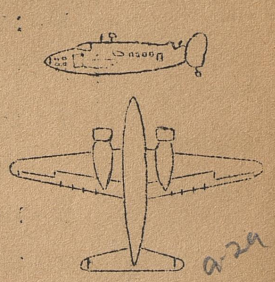
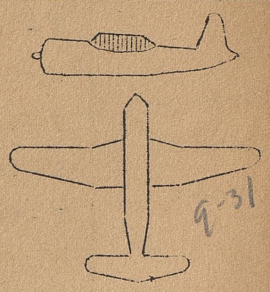
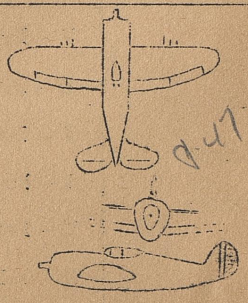
PLANE	WEFTUR SYSTEM	CHARACTERISTICS
B-26 Marauder Bomber (M.)	W - High, equally swept back and tapered. Round tips. Span 65'. E - 2 Radial, extending aft of trailing edge of wing. F - Round, streamlined. Has tailgun and top turret. Length 58' 3". T - High, triangular fin and rudder. Equally swept back & tapered to high fin. U - Dual, retractable. R -	 B-26
A-20 Havoc Bomber (L)	W - Hi, sl. dihedral, straight lead. edge, tapered trailing, span 61' 4". E - 2 Radial, tapered, underslung nacelles, extending aft of trailing edge. F - Streamlined, step-up aft of trailing edge of wing. Long nose. Length 47' 4". T - High, triangular fin & rudder. Dihedral on swept-back tailplane. U - Tricycle, retractable. R -	 A-20
A-24 Dauntless Dive Bomber	W - Low, slight dihedral, equally swept-back & tapered. Divebrakes. E - 1 Radial. Span 46'6". F - Rounded, step-up aft of wing trailing edge, high, long, unbroken cockpit. T - Single fin & rudder, swept back tailplane with straight trailing edge. U - Dual, retractable. R -	 A24

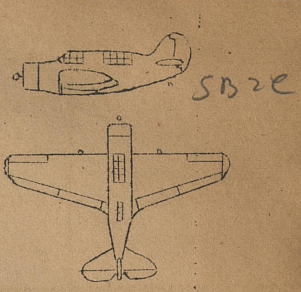
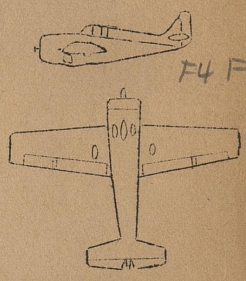
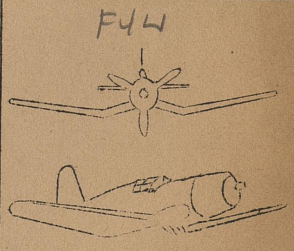
PLANE	WEFTUR SYSTEM	CHARACTERISTICS
P-51 Mustang Fighter	W - Low, equal sweepback and taper. Square tips. Dihedral. Span 37'. E - Liquid cooled, straight cowling topline, long curve on bottom to radiator aft of wing. F - Streamlined, tapered. Has rectangular headon view. Length 32' 2". T - Monoplane type, high rectangular tail plane is forward from triangular fin. Square rudder. U - Tricycle, retractable. R - Long, wide and curved, under fuselage and aft of wing.	
TBF Avenger Torpedo Bomber	W - Mid, straight flat center section, taper, sweep-back, dihedral outboard, square tips. Span 54' 2". E - Radial, short thick nose, prop set very low, straight bottom tapered top. F - Broad, streamlined, straight bottom line, sharp indent forward of tail. Length 41'. T - Monoplane type, high, broad with squared top, high tail plane with square tips. U - Dual, retractable R -	
TBD Devastator Torpedo Bomber	W - Low, trailing edge has marked taper & is faired into fuselage. Marked dihedral, round tips. Span 50'. E - One radial, round nose. F - Streamlined, with long transparent cockpit, smoothly streamlined. Length 35' T - Swept back and tapered tailplane with rounded tips. U - Dual, wheels partially retractable only. R - One round and long, mounted beneath right wing.	

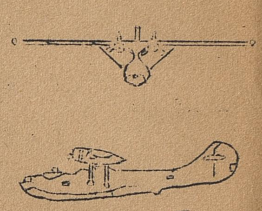
17VF

PLANE	WEFTUR SYSTEM	CHARACTERISTICS
P-38 Lightning Fighter	W – Mid, equally swept back and tapered. Span 52'. E – 2 Liquid cooled, inset nacelles, extending into twin tail booms. F – Streamlined. Stops at trailing edge of wing. Small cockpit. Length 37' 10". T – Twin, egg-shaped fins and rudders are inset. Horizontal stabilizer rectangular with round tips. U – Retractable, tricycle. R – 2 large, half way back on each tail boom.	
P-39 Aircobra Fighter	W – Low, almost at center of fuselage. Sweptback & marked taper round tips. Span 34'. E – 1 Liquid cooled. Cannon projects from nose. F – Long, slightly tapered; long nose. Side doors in cockpit. Rounded bottom. Length 29' 9". T – Semi-wasp rudder, tapered fin, stabilizer sweptback round tips. U – Tricycle, retractable. R – 1 Small cone-shaped behind cockpit enclosure.	
P-40 Warhawk Fighter	W – Low, straight leading edge, tapered trailing edge. Round tips. Span 37'4". E – Liquid cooled, with top line lower than fuselage aft section. F – Tapers slightly to tail. Long nose. Length 31' 9". T – Monoplane type, triangular fin, round rudder. Swept back illiptical stabilizer with round tips. U – Retracts under wings near fuselage. R – 1 Large square radiator under nose.	

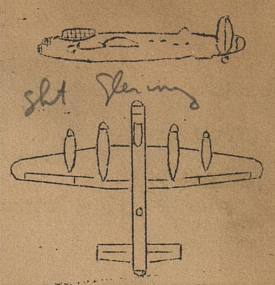
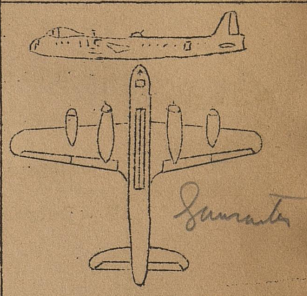
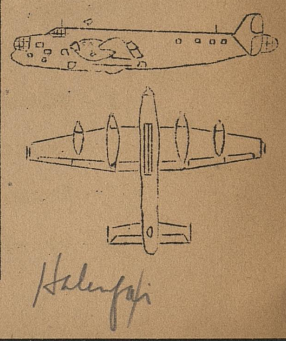
17VF

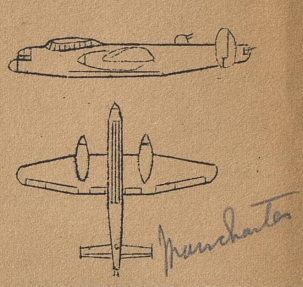
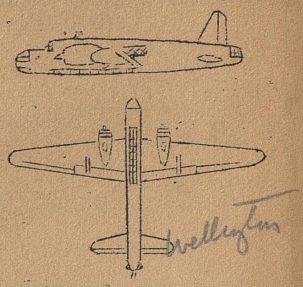
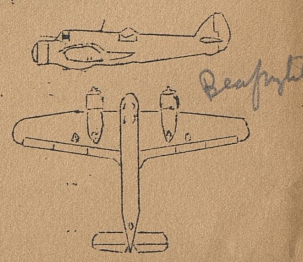
PLANE	WEFTURE SYSTEM	CHARACTERISTICS
A-29 Hudson Bomber (L)	W - Low mid, equal tapered swept back, point. Tips, trailing edge flap guides. Span 65' 6". E - 2 Radial, under wing & taper to trailing edge. F - Thick, short. Length 44' 4". T - Twin type, inset egg-shaped fins & rudders. Swept back, tapered tailplane. U - Tricycle, retractable. R -	
A-31 Vengeance Dive Bomber	W - Low-mid, swept back center, straight outboard leading edge, opposite trailing edge. E - 1 Radial, long rounded nose. Pear shaped head-on view. F - Tapers sharply aft of wing, from straight fore section, pointed aft of tail T - High, narrow, triangular fins, rudder swept back and tapered tailplane. U - Dual, retractable. R -	
P-47 Thunderbolt Fighter	W - Low, slight dihedral. Marked elliptical trailing edge. Span 41'. E - 1 Radial, with egg-shaped contour. Prop seems to be off center. F - Deep belly. Rugged in appearance. Length 37' 8". T - Monoplane type rudder and fin forms triangle. Swept-back elliptical horizontal stabil. U - Dual, retractable. R -	

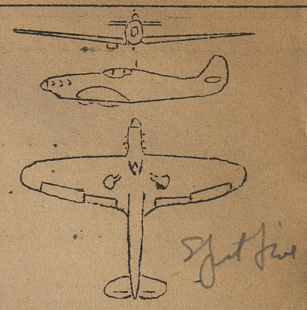
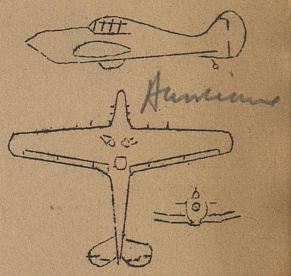
PLANE	WEFTUR SYSTEM	CHARACTERISTICS
SB2C Helldiver Scout Bomber	W - Low-mid, slight dihedral, straight leading edge, marked taper rounded tips. Span 49' 8". E - Radial, long nose, large spinner. F - Thick, curved bottom, with long canopy having 2 separate cockpits. Length 35'. T - Tailplane is swept back to round tips and is set high on fuselage. Tall rounded fin and rudder. U - Dual, retractable. R -	
F4F Wildcat Navy Fighter	W - Mid, with marked dihedral. Equal sweep-back and taper squared wing tips. Span 38' E - Radial, extends only slightly forward of wing, snub-nosed. F - Rounded, streamlined, short and chunky. Length 28' 10". T - Monoplane type, squared fin and rudder, swept-back stabilizer, rectangular elevators U - Dual, retracts into sides of fuselage. R -	
F4U Corsair Navy Fighter	W - Low, inverted gull, slightly tapered to rounded tips. Span 40'. E - Single radial, short nose. F - Streamlined, rounded, with pointed cockpit streamlined back into fuselage. Length 30'. T - Evenly tapered on leading and trailing edges. Tall fin and rudder. U - Dual, retractable. R - Two, built into leading edge of wing on either sides of fuselage.	

PLANE	WEFTUR SYSTEM	CHARACTERISTICS
PBY Catalina Navy Patrol Bomber	W - Parasol, struts, swept back and tapered outer section, square tips. Span 104' E - 2 Radial, set into wings close together. Extend far forward from wing. F - Has semicircular top, 2 water steps, hull well forward. 2 gun blisters. Length 65'. T - Monoplane type, swept-back stabilizer, round tips, tapered elevator high on tail. U - (Hull) Retractable wing tip floats. R -	 PB45

NOTES

PLANE	WEFTUR SYSTEM	CHARACTERISTICS
Lancaster (British) Bomber (H)	W - High, mid. Straight center section, with dihedral, sweepback and taper outboard. Span 102'. E - 4 in line, entirely underslung, well forward from leading edge. F - Slab-sided, blunt nose and tail turret. Box like. Length 69'. T - Twin fin and rudders, with egg shaped vertical surfaces. U - Retractable, with large fixed tail wheel. R -	
Stirling (British) Bomber (H)	W - Mid, dihedral. Equal sweepback and taper. Round tips. Span 99'. E - 4 Radial. Outboard nacelles are inset, inboard are underslung & extend to trailing edge. F - Long, boxlike appearance. Blunt nose and tail. Pilot enclosure is well forward of engines. Length 87' 3". T - High fin and rudder, well forward of tail gun turret. Tailplane is swept back to round tips. U - Dual, retractable. R -	
Halifax (British) Bomber (H)	W - Mid, with straight center section, sweep-back and taper on outboard panel. Square tips. Span 99'. E - 4 in line, rectangular nacelles underslung, extend forward from leading edge. F - Long, slab sided. Deep belly, straight top. Blunt nose and tail turret. Length 70'. T - Twin-type. Half X-shaped fin oval rudder, rectangular tailplane. U - Retractable. R - Large airscoop under nose of each engine.	

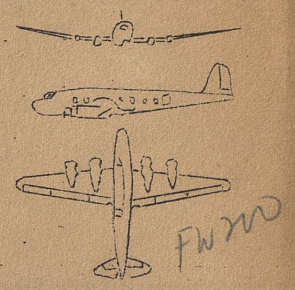
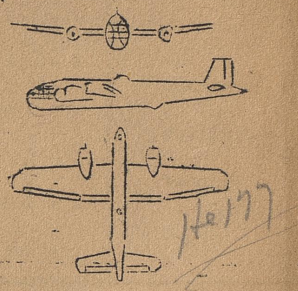
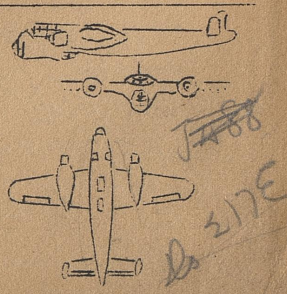
PLANE	WEFTUR SYSTEM	CHARACTERISTICS
Manchester (British) Bomber (H)	W – High mid, straight center section, outboard dihedral, taper & sweepback Span 90'. E – 2 inline with nacelles set into thick wing taper to trailing edge. F – Straight sides, straight top and bottom. Boxlike, blunt nose & tail turret. Length 70'. T – Twin; tall egg shaped outrigger fins & rudders, tailplane far forward of turret. U – Retractable. R –	
Wellington (British) Bomber (M)	W – Mid. Set far back, equal sweep back & taper. Elliptical tips. Span 86'. E – Twin radial, radial cowlings inset tapering back to ailerons. F – Slab-sided, thick belly, fish-shaped. Blunt nose and tail. Length 64'. T – Monoplane, high, narrow fin, straight rudder U – Retractable. R –	
Beaufighter (British) Fighter	W – Mid, equal sweepback and taper. Round tips. Span 47' 10". E – 2 radial, nacelles extend forward of fuselage and are inset. F – Streamlined, with observers cockpit above trailing edge of wing. T – Triangular fin and rudder. Rounded tailplane. Length 41' 4". U – Retractable. R – One above each nacelle.	

PLANE	WEFTUR SYSTEM	CHARACTERISTICS
Spitfire (British) Fighter	W - Low, with marked dihedral. Elliptical. Span 36' 10". E - One, inline, extremely narrow. F - Slender, canopy aft of wing trailing edge. Length 29' 11". T - Elliptical rudder, narrow triangular fin, elliptical tailplane forward. U - Dual, retractable. R - One square airscoop under starboard wing.	
Hurricane (British) Fighter	W - Low, straight center section, taper, tips rounded. Span 40'. E - One in line. F - Tapers sharply aft of cockpit. Length 31' 5". T - Large, almost circular. Slight sweepback and taper high mounted stabilizer U - Retractable landing gear, fixed tail wheel. R - One beneath wing at trailing edge.	

NOTES

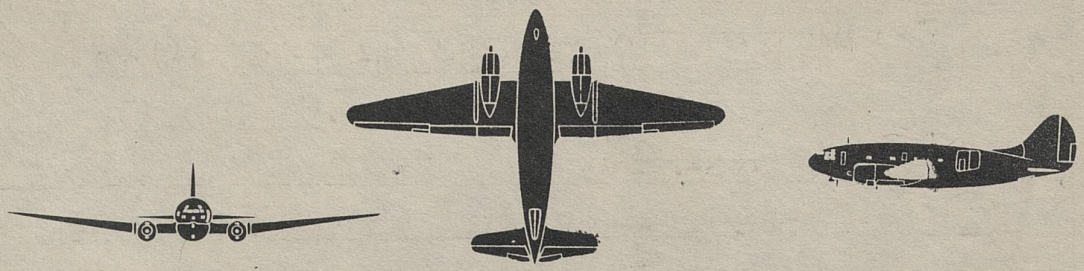
4 - 4 engine Bombers
Lancaster, Sterling, Hasliffax
2 - twin tails
Two medium Bombers (twin engines)
Mach ester & Wellington
twin tail Sq tail
Beaufighter twin engine
Sq tail nose pinturbes

2 Fighters - Spitfire & Hurricane
Rounded wg tips Sq rd wg tips

PLANE	WEFTUF SYSTEM	CHARACTERISTICS
FW 200C Kurrier (German) Bomber (H)	W - Low, equally swept-back & tapered to round tips. Span 108' 3". E - 4 radial. Inboard nacelles underslung, outward engines set into wing. F - Long, thin, wing well forward. Off-center bomb bay on bottom. Length 78'3" T - Monoplane type. Rounded fin and rudder, swept-back tailplane. U - Dual, retractable. R -	 FW 200
He 177 (German) Bomber (H)	W - Mid. Seems half-way back along fuselage. Dihedral outboard sections. Span 103'4". E - Appears to have 2 radial. Actually has 4 (2 inline in each nacelle). F - Streamlined & long nose. Has gun turrets on top & bottom. Length 67' 3". T - Hi, square-cut fin & rudder. Swept-back tailplane, squared ends. U - Dual retractable. R -	 He 177
Do 217E (German) Bomber (L)	W - High. Equally swept-back & tapered with rounded tips. Span 62' 6". E - Radial that are underslung & extend beyond trailing edge. F - Cigar-shaped. Cockpit in nose. Extends beyond tailplane. Length 56' 6". T - Twin fins and rudders outboard of equally swept-back & tapered tailplane. U - Retractable. R -	 Do 217E

Type A20	Mfr. Designation A20-(DB7-BRi)
W	MID FLAT L LE ST. TE TP TIPS CP
E	TWIN RADICAL WRIGT CYLONE UNDER SLG TP. EX Vigorous T.E
F	REG SLANT SIDE LG. TP. NOSE + CP. MID PANEL
T	SG VER TP LE + TE CR HOR PROD LE TP + TE CR TP
O	FU SWEEPS UP into TAIL - BREAK AE TO FP. T
Type B-25	Mfr. N. AMERICAN Designation B25- MITICHEL
W	MID WG GULL LE ST. TE TP CR TIP
E	TWIN TE TP EXT OVER TE WRIGHT-CYLONE
F	SLAB SIDE TURRET TOP + BELLY - TAIL EXT AFT
T	TWIN TWIN FIN RECTANGLER TP LE. CR LE
O	TRICYLE L. GEAR
Type B-26	Mfr. MARTIN Designation B-26
W	HI WG FLAT L LE TP + TE TP. CR PATT WHINTEY
E	TWIN RADICAL UNDE SLG. CELLS EXT FORE LE + AFT
F	CIGAR SHAPE TURRET TOP TAIL - FU EXT BEYOND TAIL
T	SG TAIL HI FIN - LE TP + TE CR TPS HOR - PROD. TE LE + TE
O	
Type B-17E	Mfr. BOEING Designation B17E FYLING FORTTESS
W	LOW NOR. DIHEAL LE + TE TP. CR TIPS
E	4 Radical C TIN LE SHT CELLS INBOD FORE OUT BOD
F	Lg Narrow CIGAR - TURRET AT F C.P TAIL ALSO BELLY
T	SG TAIL FIN FLARES INTO T LE TP + TE CR TIPS
O	WAIST GUNS
Type B-24	Mfr. Consolidated Designation B-24 LIBEARTOR
W	Hi Narrow wg Flat LE TP + TE CR TIPS TWIN WASP
E	4 Radical almost in line
F	SHT THICK TOP TURRET TE WG - BELOW STNGER TAIL
T	TWIN Vertical fin Oval. Hor. Rectangl
O	TRICYLE L. GEAR

36.



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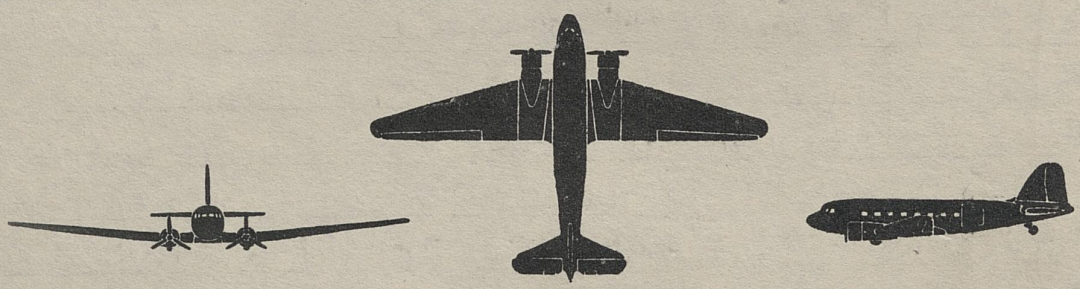

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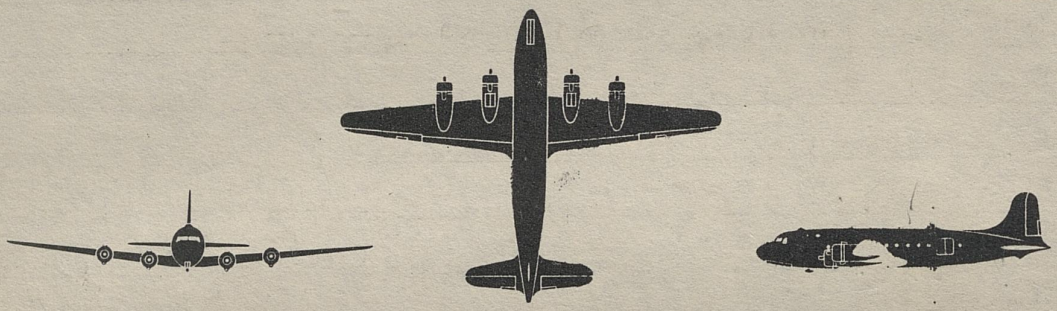

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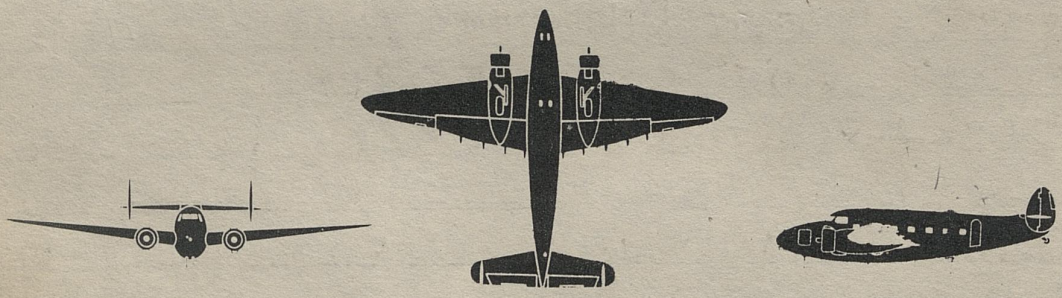


40.



Type C-46	Mfr. CURTISS Designation C-46 COMMADO
W	MID FLAT INT. PRO DIH. O.S. LE TEST (S) LE TP. STTE CT.
E	TWIN RADICIAL CELLS ½ thru wgs
F	CARGO TYBE ROW. NOSE
T	SG. FIN CR LE FLARE TE CR. TIPES HOR TP LE & TE CR TIP
O	
Type C-47	Mfr. DOUGLAS Designation C47
W	LOW WG FLAT IS. PRO DIH. OS LE TP. TEST TIPC
E	TWIN RADICAL SHT CELLS
F	CARGO STEP NOSE
T	SG. FIN LE TP FLARE INTO F. TE TP LE ST TE CR TIPS
O	FIX TAIL WHEEL
Type C54	Mfr. Douglas Designation C54
W	LOW PRO DIHEDRAL
E	4 RADICAL
F	CARGO WI DOUGLAS NOSE
T	SG FIN CR FLARE F. TP TE HOR LE TP & TE
O	TRICLYE LAND GEAR WITH DUAL WHEELS
Type C60	Mfr. LOOCHKEED Designation C60A
W	MID PRO DIHE. LE TP & TE CR TIP
E	TWIN RADICAL
F	CABIN TYPE
T	TWIN EGGY SHAPE FIN LE TP TEST ANBOARD
O	FIX TAIL WHEEL
Type C61	Mfr. FAIRCHILD Designation C61
W	HI FLAT WG RET. SHAPE VATF IN LE
E	SG RADICAL
F	CABIN TYPE FIX LANDING G. - EXT. WG BRACES
T	SG FIN TR LE & TE (HOR) TP. LE & TE CR.
O	



Battle Ships

3 or 4 more guns with 3 guns each 14 to 16 in
20 miles range
Main Battery are aimed at armed side of a
Captial ship
Also mount secondary Cal. guns are against
other targets 3 and 5 inch Anti Aircraft guns 8 or 10
of these guns range to 8,000 ft
Weight must be constructed in heavy armor in the deck
" of engine must be surface of armament total
25 or 43% of displacement of the ship. displace
adv. 35,000 tons 100 ft wide 750 ft long
Ranges from 20 knots to 28 Can grate enough
power to supply a city, lights etc.
Carry crew of 1300. Cruising range to 10,000 to 15,000 miles
Seldom goes into action alone, goes with other ships.
Carries 3 to 5 planes for scouting + protecting. Use against
ships only against type and ship like it self

Heavy Cruiser

8 inch guns main Battery, 8 5 inch Anti Aircraft
gun. Used against enemy Cruiser, destroyers etc
and ships its own size. Armor 3 to 5 inches on
sides 3 or 4 in deck. Hear Cruiser 500 ft long 80 ft
in beam 32 knots speed. cruising range
10,000 to 14000. ✓ are to the speed. Can manner
better than a battleship may be use as a scout.

In battle takes place fst of Battle Ship

Light Cruiser

Only difference is the guns or fire power
Guns. 12 to 15 6 inch guns also carry 16
38 cal dual purpose guns. Carry 6 21 inch
torpedo tubes in triple mounts 2 or 3 planes
Low Dam 3½ inch side 2 inch on deck.
Length 10 to 1 9000 horse power turbines
Speed of 35 knots Range 13,000 at 15 knots
Can maneuver as a destroyer. in action
takes place in front of Heavy Cruisers
Maybe use as a advance recon group

Destroyers

Smaller and highly manuvrally
5, 5 in guns 10 smaller ones 10 to 16
torpedo tubes, uses also depth guns and
anti air craft guns. 12.5 to 1 35 to 41
knots 50,000 horse power Range 9,000 miles 15 knots
180° turn one minute Usually 8 destroys to
each Capital Ships. Use to Break thru
enemy screens. Dash on and out.

Air Craft Carrier

One of the largest ship in the fleet outside
of the Battleship 8 to 18 inch. Ordinarily
not in combat guns, will stay in

range of their planes. More anti-air exept guns than any other ships 34 knots speed range 12,000 miles. Follow main fleet where ever it goes. Little maneuverability. Head into wind when planes are taking off and landings. Stop 2 by cables and hooks. Always protected by destroyers and cruisers. Carry 1600 men and 80 planes.

know what a azimuth is line + direction
measured from North can be from the 3 Norths
such as Magnetic, True, + Grid North

Latitudes are indicated by parallels (∠ measured ∠
N. S. equator Longitude is ∠ east west ∠ a
certain prime meridian

Air Plane Structers

Fuselages, engine mounts stabilized and control surfaces, landing gear.

Fin or stabilizer rudder
horizt. stab, with evolutions underneath
tail wheel stearbale with rudder

fuselage body of air plane with wings
engine mounts called

wings leading edge and trailing edge. aerlon
controls underside flaps. Control surfaces
has tabs
Prop provides thrust for flight
Fuel press 3 to 5 lbs tech 3 to 4 lbs.
(On guys use tech. order)
know Starting procedures

⊛ Are 8 to 900 R.P.M on warm up after
engine starts check RPM on 1400 R.P.M.
Full throttle mixture rich on take off
Set alti at 0 check Oil Fuel press. and
temp.

⊛ Outside loops are prohibited and faking
outside loops in P.T. Slow roll and
snap rolls are minimum speeds Snap

⊛ soll speed 90 M.P.H Slow soll at
130 MPH
Ranger 175 horse power driving
R.P.M 2940 take off maximum 2450
run 1850 to 2050 RPM. Hi speed flight
2450 RPM maximum at max watch
engine temp. Fuel hi speed 19 gals
per hour Maximum Cruising 2140 R.P.M
fuel comp. 11 gals hour Desired Cruising
2645 R.P.M. or drop low as 1945 R.P.M
8.25 and 9.8 gal/hr. Cylinder head temp.
max 270°c maximum at take off
240°c at max hi speed. Desired Cruising
216°c max ⊕ Air press at 60 lbs sq in
includes auto pressure normal flight
operations maximum is at 70 lbs sq in
minimum for Cruising 50 lbs and idling
15 lbs.

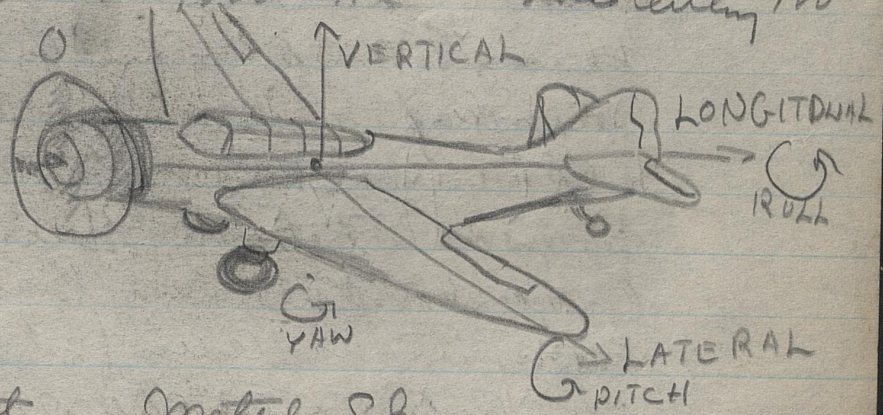
⊛ 220 max air speed
Ceiling 15,300 ft
Critical alti is at sea level
Absolute Ceiling 17,500 ft.
Gross weight 2409 lbs. Fuel Cap 45 gals
131.5 indicated air speed at hi Cruising
Normal oper speed 105 at 2050 RPM
Sea level Climbing speed 94 mph.
5,000 are 98½ MPH

15000, at 109 MPH 10,000 is 103½ MPH

Engine RPM Sea level 2270 RPM - 94 MPH
" " 5000 2265 " "
" " 10000 2260 "

Total Brake Horse Power (amount h.p. produce at prop. Shaft.
Sea Level 168 hp 5000 138 hp 1000, 111 hp
15000 90 hp 17000 89 hp.

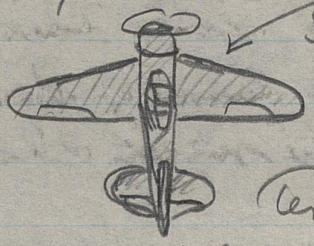
Maximum rate climb at sea level is 920 ft per min. 5,000 - 610
10,000 - 340 15,000 - 112 Service Ceiling - 100
0 or 17,500 - 0



Monocquet Metal Skin
"
Full Mono: Bulkheads and doors
Semi Mon. used by A.A.F. Longerons
Reinforced Full interional Construction

Trim tab, Balance tab, servo tab

Sweep Back ∠ between the plane of the lateral axis and the actual wing



SWEEP BACK

use to give greater directional stability

Tendency to stall first at tips

Dihedral - ∠ between the plane and the lateral axis



BIPLANES

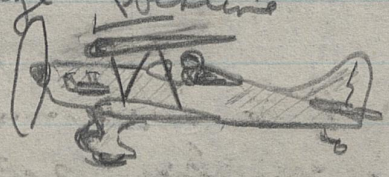
Stagger

Positive



Decalage

Positive



Propeller is a air foil type

Outside edge called blade back

blade face is side seen from cockpit

Camberside back

Prop makes own Realtive winds

also is similar to a air foil.

Angel of pitch ∠ of blade ∠ of the prop

Chord line makes with plane rotation

or plane in which it turns.

Angle of attack of a prop
The angle prop blade makes with a line perpendicular to Crank shaft is the Blade Angle or pitch
Angle of attack is the angle of the prop blade to the angel between the mean chord and the relative wind
Section of the blade that fits into the hub is Called blade root
to keep the Angel of attack constant the prop is twisted

fix pitch, adjustable on ground, two pitch Controllable from pit and Constant speed prop.

(Angle of pitch is the ∠ between the mean chord of the blade and the plane of rotation)

Hi speed or low speed ∠ of attack decreases or increases

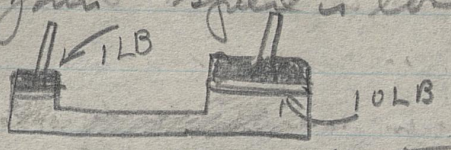
Larger horse power engines calls for larger props tri blades etc. two blades is the best of the two.

Load factors

PT 2409 lbs is weight on ground and in normal, straight level flight.
Any change in this it will change its load from positive and negative
For instance in a dive, the pull out-
force wants to continue pulling down.
Any change in airspeed will cause more
load in change in L/g attack.
Basic load is normal weight (i.e. on ground)
Maximum applied or possible load is the
greatest load placed on the planes structure
during normal flying. The ultimate load
is the maximum load that the plane can
hold (Army 1½ times to maximum load)
The difference between maximum applied
load and the ultimate load is the factor
of safety.
To find the stalling point with ultimate load
factor of. 60 mph is stalling speed
normal flight = 1G.
46 would stall at 120
square root of 3 times 60 MPH

Hydraulic

Force of a fluid can transmitt power thru tubes etc
Force gain speed is lost distance



All fluids are affected by temp. expandes or contracts. Must have a resevoir in a plane for the fluid. Power pump furnishes necessary press. capable hi press with out hi volume. Hydr. power pump run by engine. Surage chamber is bladder or spring loaded, takes up press. of the hyd. fluid. Pressure tank allows press. fluid to stored. (reserve power storage space) Press regulator spring type two way, large affair reg. 25 & 30 lbs. Some have a relief value excess press opens relief valve and put around into press pump. Also uses check valves.
Air pistons system - overrite inject value a obstruction in check value to allow fluid to flow one way. Select value lets flow to any part of the system. Avocating cylinder is final part that transmitt the work to mechanical action that is wanted.



Check Valve

Mic.

Fixed and portable fire fighting equip
Chemical Carbon dioxide and Carbon tetra Chloride

Flotation equip inflated 1 lb per sq inch for use of flying over water
Carbon Dioxide
Deicing equip. Common air shot thru expanding rubber on leading edge

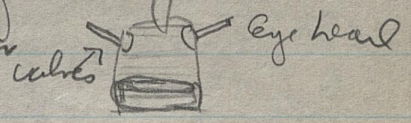
- Oxygen equip - Li altitude flying
- Parachute flares to locate objects and places night flying Deckwind etc rate descent 600 ft per min burn for aprox 3 minutes allow 400 ft between flare and ground to prevent fire (2200)

Air Craft Engines 18 to 23

Purpose give pilots fundamental understanding how they work properly and safetly without injuring expensive equip. The operation or life depends on the way the pilot handels them or treats them.

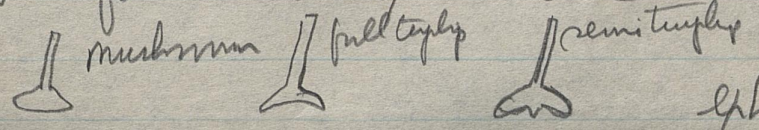
Fundamental parts cylinder chamber fuel is taken in, burned and develops power. Can be air cool or air cooled, both are the same operations air cool cylinder surround by fins water cool by jacket two parts barrel and head. Head is where burning occurs made of alumin alloy barrell made of steel. Are heated string together. Head is not removable in modern air craft engines

Cylinder, has two spark plugs each side, port for exhaust to escape and port to take in air and fuel gas. (Transforms heat energy to mechanical energy) guides for valve stems holds valves in place pocket valve stem head were sits on cylinder



smoother surface for cylinder

disadvantages, apparatus has to be used to run valves valve face sits on cylinder and



exhaust valve

the temp are higher, more fins are added on that side of the cylinder. exhaust valves are hollo and filled with chemical in order to help cool the exhaust valve stem (metal sodium) or (mercury) transfers heat rapidly

Cylinder has a valve guides, used to keep the values up and down in the same plane

Cam plate, or drum or ring two tracks one used to operate exhaust valve and intake vale the cam has a follower with a small wheel
Cam follower held in place by the case craft shaft
Then it is force to pass over the lobes is forced up attacble to it is a push rod in a case which is fits into a sock to the rocker arm Cam drum is connected to crank shaft and turns around
Valve spring holds valve in closed position fits against valve guide in cylinder and on the valve. When valve is open spring compress and vice versa. 3 or 2 springs are used gives greater tension in smaller space help damping out of rebound and side swinging of them and if one springs breaks have another to carry on



Cam

In line engines a cram shaft runs along the engine and uses same valve mechanism

Piston is plunger working inside the cylinder. works up and down.
Piston head and skirt slots around head to hold rings hole in skirt to hold wrist pin smaller at head than at skirt. when running

(read section Connecting rods and crank shafts) (26 to page 30)

and heated the head will expand (same for valves) Pistons rings are split elastical ring (big grade cast iron) are provide to give a flush fit against cylinder walls. 3 types. 3 upper rings are compression ring 4 ring is split in two. is a oil control the split allows oil to go thru the piston 5 ring is the oil wiper ring wipes oil off cylinder walls and is also a oil control ring. Wrist pin ~~moves in force~~ and connecting rod and in the piston. Wrist pins are hollow, has to prevented from sliding out and hitting the cylinder walls. Used a aluminium alloy plug or end in order to wear out the plug and not the cylinder wall. (curved and polished)

Maps 8.2

Maps are a graphic representation of a portion of the earth surface on a plane surface

Equal area projection + true shape area projection is transferring outlines of ground area on to a flat area

Scale

by representative fraction R.F $\frac{1}{1,000,000}$

1" = 1 mile or 1: 1,000,000

or by graphic scale; + words + figures

1 mi = 5280 ft. or 63360 in

1 nautic mile = 6,080 ft or 1.15 Statute mile

1 meter = 39.37 inch. or 1.094 yds

1 kilometer = 1,094 yds or 1.62 mi

Measure distance with edge paper and a map measurer.

$$RF = \frac{\text{FOCAL-LENGTH}}{\text{HEIGHT}}$$

Depends a true grid, unit of measure and a standard system of measure. North can be shown on a map as true, magnetic and grid

Line north passes thru a fixed true line thru the geographical North pole. Magnetic north is indicate by a freely suspended compass needle influence only by the earth magnetic field

Magnitude

1" on a sectional chart 1: 500,000 is 8 miles
" on a Regionale " 1: 1000,000 is 16 miles
1: 62,500 = 1" = 1 mile

Grid North are lines representive on a military grid map. Unit of mesure are 0° 1/360 of a circle, each ° is divide into 60 minutes, each minute = 60 seconds
French have a 400° Circle 9/10 as large as ours.
Field Artley uses mil = 6400 mils in a circle
1° = 17.8 mil 1 mil = 3 min 24 sec Clockwise unit of mesure in degrees between designated North and a pt. to be located is Bearing or Azimuth
North pole is located at 71° North and 91° West (Magnetic)
- Magnetic South 72° 30' South 156° East. The angel mesured East & west from the true meridian of a point from the magnetic point is Variation or declination. Deviation is the difference between magnetic North and compass north brought about by the influence of the magnetic pull of which the instrument is mounted (such as a plane etc)
Magnetic bearing is mesured clockwise from Magnetic North. Add West Variation, Sub Easterly Variation

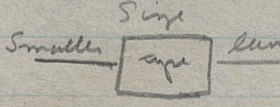
Classification

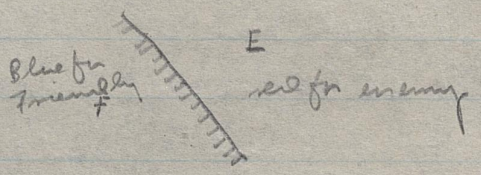
Gnomic projections and the Conformal - Equal area - Conformal preserves Shapes Equal area projections preserves area in true proportion, Zenith perseveres identical direction and obtraulleard - any type of projection
Types - Mercator (Cont on Page 2 Book #2)

Maps. Signs + Symbols

Marginal data on map written information
Erlations - by class and inform. on bottom data

Size
Smaller — type — larger





Blue for friendly F — E — red for enemy

Always use a ruler or Compass for maps drawing -
Symbols are ½ long ¼ deep

• squad | CO | X Brigade | ○ armdf. | ⊄ horse + med.
•• section | II Battlion | XX division | • art. | ⊄ mech calv.
••• platoon | III Regt. | XXX Corp | / Cavalry | G Chemical W F-ave
XXXX Army

A - anti. a.c. | ∞ air force | XXXX - Army of Aviation
E - Engineers | X - Wing | I - I light
MP. | XX - Command | II ~~Group~~
XXX - air force | III Group

Industrial + Military Bases

Hospital | Gas | Temporary | Permanent

Class I supplies | dP distributing point | ammo

Gasoline + oil | PW prisoner war | Search lite

emergency landing field | aerodrome | airport

arsenal | Concrete wire entagments | Wire ent

Command Post

S-2 - Intelligence A.F.

[AR-380-5 Safe Guarding Military Information (Read)

Grid Coordinates

Grid Zone a is 78° Longitude W South boundary is 78° S and North it is 49°10

(X-X) (1218-2139) (18-39)

Elevation and Relief

Hachures system - method of shading strokes drawn in direction in which water would flow. Contour lines — a imaginary line on the ground represents on a map a line on which each the (points) at the same elevation. -Color layer system

Distance from the pt. of the mount to the Contour X 20 divide by the distance between the 2 contours will = the Elevation

$\frac{X}{CI} = \frac{d}{D}$ CI - contour line

Per cent of slope is expressed in hundreds - mils is expressed by thousand $\frac{600}{50}$ or $\frac{16}{50} = \frac{Y}{100} = 32\%$ (%)

By mils $\frac{16}{50} = \frac{X}{1000} = 57.3$ mils

(Portmiller inst.)

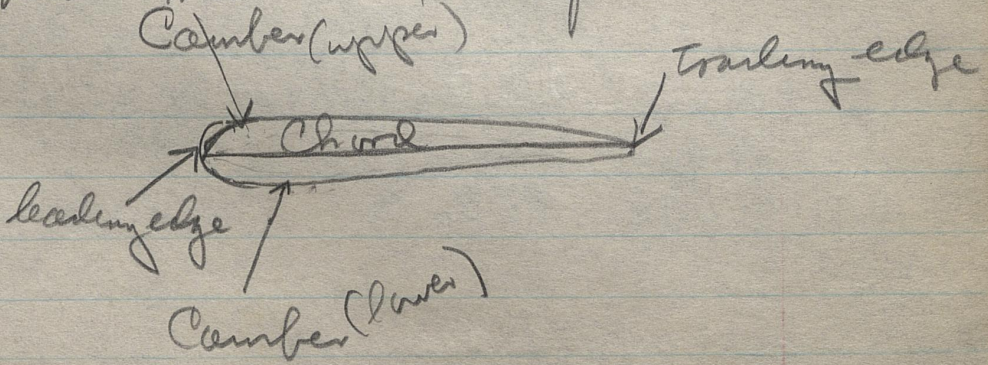
Theory of Flight

Read the following in text book
General Outline

Lesson II Paras 1-6 7-9
" III " 28-34
" IV " 36-52
" V " 53-69
" VI " 86-101

Aerodynamics airfoil surface or any group of surface that give useful reaction dynamic action with the air is a airfoil

Aerodynamics is treats of motion of the air and other gaseous fluids and forces on solids in motion relative to such fluids



Camber departure of curvature from chord

Bernoulles increases of velocity decreases the pressure



Heavy planes

Laminar theorm
Bernoulli theorm

Laminar flow or stream line flow
Stream flow is flow of the air over the air foil with least amount of turbulence

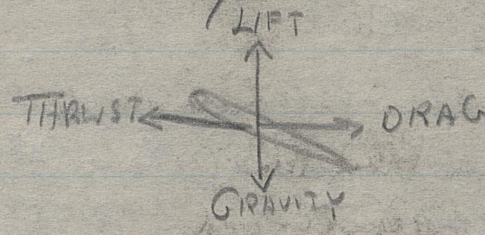
Mean Chord is average length of all chords in wing

Forces

Relative Wind - is opp. or Reciprocal of the path of flight
Angle of attack is angle of the wind and the chord of the air foil
Angle of incidence is the angle between the chord and the longitudinal axis
Angel between longitudinal axis and relative wind is angle of pitch

Center of Gravity

Center of pressure is usually back of Center of Gravity (Center pressure is where the all pressure is ~~[illegible]~~ (Point)



Normal level flight Constant speed

Lift is always perpendicular to relative winds
Drag is " parallel to " "
Gravity or weight vertical or downward to " "
Lift increase with angle of attack within limits until stalling or burbuling point is reached Max L of attack is stalling point Drag increases as L of attack increases within limits but not proportional

Negative pressure is press less than normal atmospheric pressure, positive is press. greater than normal atmospheric pressure.

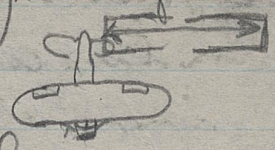
Read Pag. 22 to 27 102-117

lift — coefficient of lift — density of air — area of wing — velocity

Formula ⇒ $L = C_L \, DAV^2$

Aspect ratio span of the wing to the mean Chord

$\left(\frac{\text{Span of wing}}{\text{Chord}}\right)$ rectangular wing



$\frac{\text{Span of wing}^2}{\text{area or mean Chord}} =$

3 kinds of Drag ① Profile Drag or Skin friction
② induced Drag (to produce lift
③ Parasite wheels etc bracing etc.

Stability

① Static (fin adjusted to keep it straight
Built in the Aircraft.
② Dynamic, are damping of the oscillations

Directional Stability helps, fin, wings and Shape of fuselage

Lateral Stability by dihedral of the wings and horz. stabilizer or tail

Longitudinal Stability Ailerons

Slots -> and flaps

use flaps to come in at a steeper angel and can make runway shorter. Or to get down over obstruction around landing area or in take off. Slight decrease in air speed but large decrease in ground speed.

Weather or Metorology

Ten weather elements

Visible elements ① Clouds ② Present weather ③ Visibility
④ Pressure ⑤ Temperature ⑥ Dew point
⑦ Wind direction ⑧ Wind velocity ⑨ Ceiling
⑩ Precipitation

First 3 - visible elements Most important are Clouds 100 Classification of Clouds 10 types and two groups 75 state of present weather Visibility is the mean horizontal distance that by which prominent objects may be seen or identified by the naked eye Visibility is limited by Clouds
Pressure is the sum total weight of the atmosphere measured in mill bars (M.B). inch. mercurial barometer Sea Level is 14.7 sq in or 29.92 inch of mercury or 1013.2 m.B. and 59°F
temperature measures heat in degree Fahrenheit
Dew point is that temp. to which a parcel of air must be reduced before saturation occurs Measured in °F measured by sling phycrometer
(When temp. and dew point gets together means some form of precipitation

Read Page 1-2-3

Wind direction is measured by points on a compass (used on a weather vain)
Wind velocity is measured by miles per hour instrument used is a anemometer
Ceiling is the vertical distance from the ground to the base of the lowest cloud when that distance is less than 10,000 and the sky is more 5/10 covered Ceiling is measured in hundreds of feet - measured by ballons and instantaneous of clouds with prominent objects and clenometer. Pilot reports
Precipitation is measured in inches and hundreds of inches. Inst. use is rain and snow gage
○ ⦶ ⦷ ⊕
Air tel type anything below wind direction is in group 5

Group 1 — Station designator — type of report with time given

SA X SPL 1940 — time only with spl report with zone

Classification of field

X = Closed for landings or take offs
C = Contact flight = visual aids
N = instrument reports
a blank is a field without traffic uncontrolled
LCL local report SPL = special report

Group 2

Ceiling Scattered Broken Clouds Visibility

4 ⦶ ⦷ 1/4

Group 3

Thunder Rain Heavy Fog Blowing Sand

TR-L-F, + BN

Group 4

Barometer Pressure Temp Dew Point

99.9/46/46/

South MPH altimeter Group 5 Break or overcast

↓25/992 ⊕ NW in N.W direction

Sta. Classification type time ceiling sky Cond

P ← Visibility BP + DP Wind D + Velocity

alt add. remarks

April 5th

Aerial Gunnery

Machine Gun is a weapon that performs that performs all the neeceary for firing, loading and ejecting with in its self, is a fully automatic weapon

Semi Automatic is a weapon that has to be fired by pulling tegger each time and all other things take place in it self.

types

Cal 50 M2 - Feeds from both sides

Cal 50 M1 one side feed 30 Cal

1. Reciver and barrel jacket group

a - Barrel jacket b Barrel bearing

Reciever → Breech lock cram Cocking lever Cram, extractor Cam, bolt locking shut extractor switch, tigger bar, Cartridge stop lock stripper, Belt holding pawl, Belt holding pawl pins, Cover dentent pawl, retarding slide retarding slide bracket, and lever Assembly

Back plate group - Back plate, buffer assembly and Buffer tube, Buffer plate, buffer clits, Buffer adjusting screw, Spade grips Back plate latch Back plate latch lock, tigger and safety

Bolt Group

driving spring + rod. bolt stud, extractor assembly, extractor hook, extractor lug ejector, Bolt switch. Bolt switch stud Cocking lever, sear stop + pin Sear slide, Sear, sear hook; sear spring firing pin extension, firing pin spring firing pin + sleeve Only the group is the bolt, recoil plate, the stud extractor stop stud, Cam groves. lower projection, breech lock recess

Oil Buffer group

accelerator, accelerator pin. accelator lugs accelator locking lugs, oil buffer body oil buffer tube assembly, oil buffer piston rod, oil buffer piston rod thumb., oil buffer valve assembly, oil buffer spring, oil buffer gland packing body spring and ring buffer tube, oil buffer filler screws. Breech lock depressor, oil buffer tube locking spring, oil buffer body retaining spring

Barrel + Barrel Extension Group

Barrel locking spring, barrel extension thumb, breech lock, breech lock pin inside Barrel, lands and grove

Cover Group + Belt feeding

Cover plate, Cover latch, Cover latch spring
Cover hinge pin, Belt feed lever, Belt feed lever
stud, Belt feed lever plunger + spring, belt feed
slide, belt feed pawl, belt feed pawl arm, Cover extractor
spring, Cover extractor cam

Extra
(field stripping, disassembly gun to groups
detail stripping, disassembling all groups.)

Principal of operation of Browning Machine Gun M2
Principal operation is short recoil, taking place in
side of gun, belt fed fully automatic, in metallic
belt is the Ammo. Can be fed from either side. Weight
of gun is 64 lbs Weight of barrel 36 inch long 10 lbs. Overall
length 56.125 in Muzzle Velocity 2,750 ft per sec
(1,875 mph) Maximum effective range 600 yds
Rate of fire 750 to 850 rounds per min. Maximum
Range 7,200 yds or 4.1 mi length recoil of bolt
7½ in Recoil of barrel and barrel extension group
1⅛ in Distance of the bolt and barrel + barrel
extension group is still lock together is 5/8 in

Head space - distance between the shoulders of
the Chamber and the face of the bolt when the bolt
is in battery position

Chief timing device on 50 cal is the accelartor. Rate of fire control - the oil buffer screw (adjusting) Fire control is the cocking lever.

A Malfaction is any improper action of any part of the gun or Ammo. that may result in a stoppage or prevent the normal action of the gun. 3 kinds - Failes to feed, and failures to fire and run away gun.

2 types of stoppages temporary and prolong temporary can be stop by imediate action a prolong stoppage is one that can not be cleared by imediate action, need tools and is a broken part etc. Imediate action is Charing the gun,

3 types stoppages 1st, 2nd and 3rd Position Stoppage

1st - in forward or battery position

2nd - Just out of battery and halfway back

3rd - from half way back to all the way back

Intelligence S-2 A.A.C

Tec Manual 03-45

Regiment - hdq & hdq co, units of special weapons

Brigade, division Corp and Army
Co, battlion and Regiment
Brigade = 3 Division of same thing hdq & hdq co.
Corp - Tactical Corp hdq Army hdq variable no of Corp and division Admin & tactical unit
Task Force. infantry Air Corp. Navy Armored Force etc.
Inflang square 22,000 triangle 15,000 Motorized 16,000 " Armd Div 12,000 Infantry 2000 F. A. Brigade
Theater of War, is theater of operation and place where war can break out. Theater of operations place where battle is taking place. Line of Interior i.e. Austrial, Combat Line fighting Line
Communications - line between Combat Line & supplies
Line officer - head Staff officer assist the commander. Staff - sequires info. (2)
details Com. plans (3)
(4) place things that needs Com under attention

(6) take necessary actions to carry out C.O orders

Army Air Force
Corps Command
Div Wing
Regt Grp
BW
Co Sqn
Plt Flt
Sqd Crew

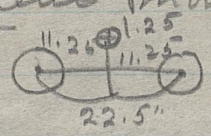
German Luftwaffe

Luftflotten Air Fleets
Fliegerkorps
Geschwader

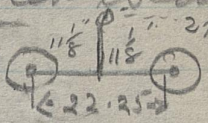
Harmonization

Purpose is to enable the gunner to aline the axis of the bores parrell with line of sight
in order to do this (1) know demenation of guns on each turrett and know where sight are located

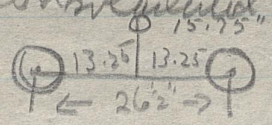
old martin



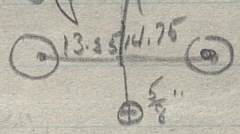
New Martin



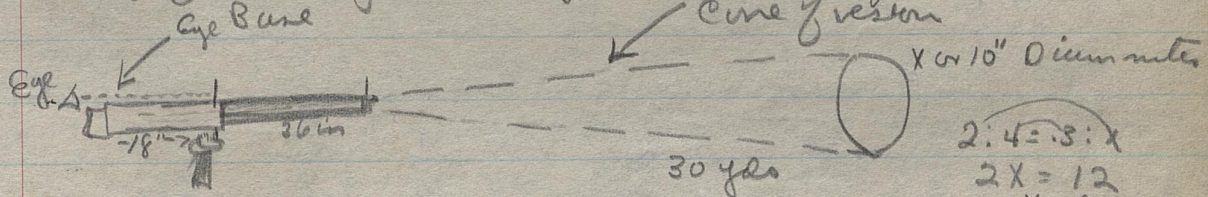
Consolidated Tail



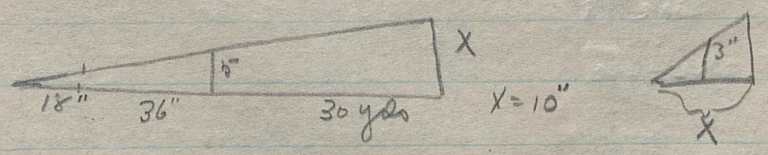
Sperry ball



Eye base is the distance from the gunners eye to the breech end of the barrel
Range from the gunners eye the distance of the target



$2:4 = 3:X$
$2X = 12$
$X = 6$



$1.5:30 = 5:X$
$1.5X = 150$
$X = 10$

Combat - Intelligence S2

Reference A.R. 380-5 FM 5-20 FM 30-25
MID Information Bulletin No 3 12/24/42
Training Circular No 47 7/18/41

Counter Intelligence

Purpose - to destroy the enemy intelligence systems
(1) Carried out to maintain element of surprise to the movements etc of our own army (2) also designed to conceal our situations and our intentions
(3) to counteract propaganda that goes on in our own lines Negative measure are designed to conceal our situation from the enemy. Positions is to confuse the enemy of our own strength etc or situation.

(1) Enemy Intelligence measure. Aerial observation and aerial photos. (we will be careful of locations of importatant things with concelement
Camaflage it always fools and counter acts aerial photos etc. Such as tracks, paths, trails etc. Control of tarrific movement. Smoke from mess fires. Location of hdq in theater of operation
(2) Enemy puts out raids, patrols etc on reconnaissance we protect our own bases. Such as out bases, keeping contact with adjacent out fits (3) Prisoners, the getting of information, identification etc. Drill out men to keep mum etc.
(4) Enemy will obtain information from documents maps & plans etc. We must handel it secretly

No person shall carry secret documents. Must be constantly on alert that they don't get into unauthorized personal hands.

(5) Captured equipment, the enemy gains info. from them. We must make means of destroying the secret equip. Our craft must be destroyed. Some equip have self destroying mech. Removing identifying marks on planes. (6) Radio and its interception, location of radio. We counter act radio discipline. All messages are coded. (7) Civilian inhabitants and employees. on the lines of light, telephone radio etc (8) Espionage must be careful that all personnel are indoctrinated properly. Such as badges for war workers and soldiers dog tags.

2nd week (Our Intelligence plan)

Intelligence plan a current way planning out the work in such a way to the answers the Co Admits. (Remember) Essential Elements of Information (?) Questions i.e. what they want to know, get, etc (Who, what, where)

Files + Records

Filing system to file away Correspondence - the Dewey Decimal system - Every thing is devided down into 10 divisions and each one of them have been subed devided into 10 and each one of the sub devided 10 has been devided down to 10 Each division has been given a numerical heading. See War Dept Correspondence File. found in Sgt Majors office on every field and army post. FM 1-40 47-48-49

Publication Index

a list of publication that comes into the office and hows were they are. (Inventory) keep in a loose leaf note book with each type on a page alone such as all Bulletins

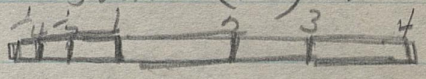
Subject Index

Lists all the publications that refer to a particular Subject Kept on a 3 x 5 card in a small cabinet by alphabetical

Sec 18 Power Turret Convolidated (tail) B-24
6th Squadron training (Harlingen Texas) Gunnery School.

Securing steps connected to pressure
Be sure in entering turret 3 valves are closed
Main Shut off valve, By pass valve, elevating horizontal
azmith by pass valve
will move 61° to right and 61° to left total
elevation +71° up to 00 — to -30° down
-Notice- Make sure Main Shut off is closed and
the selector two valves.
the turret is operated by system of hydraulics

S-2 Maps.

Scale is the relationship between distance on a map
and actual ground distances = Maps are classified
as large, small + medium Represented further, more
and figures, graphic scale 1E 1/500,000 (Ft.) 1 inch =
1 foot on ground. Graphic Scale 
1 mi = 5280 ft or 63360 in. 1 nautical mile = 1.15 S mi
or 6080 ft. Large Scale is not large 1/20,000, a medium
scale not over 1/50,000 1/25,000 Small scale is 1/100,000 and up
Can be measured by paper or string and graphic scale
or a ruler. Curved line by tacks on paper. D = T x R

Speery Ball turret

Steps for entering turret

1. install hand cranks on shaft
2. Loosen Brake on hand cranks
3. Release outside elevation clutch
4.

S-2 Intelligence

Information - as used in Intell. procedure includes all documents, facts, photographs, diagrams, maps reports or observations of every kind which may serve to throw light on a possible or actual enemy military economic and political situation that will affect us in War against him.

Military Intelligence - when all inform. available at the moment has been collected, suggested as to subject matter evaluated as to authenticity, interpreted as to meaning and carefully analyzed, and studied ~~and~~ or tactical conclusions have been drawn therefrom the result is known as military intelligence

Combat Intelligence - is the military intelligence produced in the field after the outbreak of hostilities by the military intelligence section of G.H.Q and by corresponding sections of all subordinate units. Generally the type or class of Intell. is confined to deductions made from a consideration of infor. from the enemy's location, strength, composition dispositions, movements, armaments, equipment, logistical system and lines of communication; of his tactics training discipline and of moral and of the terrain and current weather conditions existing in the theater of operations

War Dept. Intelligence - is military Intell. produced under the direction of the War Dept, General staff in peace and in war. Every Country and possible theater of operations are studied. Such studies include

F.M. 440 to be read

Composition, disposition, fighting quality, organization, Army armament, equipment and tactical and supply methods of the armed forces. (Continued) →

Responsibility of High Commanders - resources in man power and material and the period of time required to convert them to use. Economic and political conditions and appreciations, history and national characteristics and military geography, topography and climatic conditions all these features change our plans our method training, armament, equipment and supplies to meet the tactical and strategical situations

The Military intelligence division of the War Dept Gen. staff is responsible for gathering and disseminating this intelligence, keeping up to date and issuing necessary maps and, monographs and reports to field forces when ever required by them

Responsibility to the Commander - To keep him informed at all times of the situation

S-2 - does collects, investigates interprets and disseminates all material that comes in his office

Things to know about infor. (1) whether its true (2) know what it means (3) affect the big picture (4) who else knows about it (5) Shall I report it at once to my Commander (6) Do something about it

Classification of Information - Any inform. that assists the Air Commander or in its execution (making his decision) is the concern of the Intelligence Section.

I Classification of Information (1) Information of objectives (a) his location (B) nature of the target (C) Size of the target (D) type of construction (E) valuability to air attack (2) Information the enemy (a) strength, disposition of movement [1] units in operation [2] designation & type of units encountered [3] Reforcements of the enemy [4] Changes in the above units [5] movements of the enemy (B) Supply & equipment (C) Air operations (fighter) [1] what kind (types) of planes [2] Aggressive or Cautious [3] Maximum Consecration [4] Size & type of formation and altitude [5] Method of attacks [6] Method of supporting bombardment [7] Rivets, Rallying and Rendowe Points [8] Any area particular well guarded from our reconnaissance [9] Possible missions [10] Most favorable disposed or best target to attack (D) Air Operation Bombardment See above (1) [2] [3] [4] [5] [6] Navigation Methods [7] [8] Pursuit support [9] Size any types of bombs. [10] [11] Results of our attack (E) Air Operation Reconnaissance Same as See above 1, 2, [3] Area Covers, operating altitude & time [4] Navigation Methods [5] Changes routes altitude etc [5] nature of missions performs close or distance, visual or photo Army Cooper.

F.M - 1-20

[6] Information that he obtained (F) Anti Air Craft weapons, barrage ballons and search lites (G) enemy Caus lites of men. Air Craft prisoner (H) How much the enemy knowledge of our Air situations (I) Operations Naval (J) Weather Conditions especially over the enemy targets.

II Collecting Agencies (Air Force) (1) Reconnaissance aviation (2) Bombardment aviation (Interaggation) (3) Fighter & pursuit Aviation (4) Mapping Aviation (5) Air Craft warning service (6) Air Force Weather service (7) Examination of prisoners of war, deserters and inhabitants (8) Exam of Captured documents (9) Exam of Captured air material (Crash intelligence) (10) Signal intelligence Service (11) higher & adjacent air Commands

III Collecting Agencies (Ground Forces)

Connection of S-2 and Combat Crew

Briefing Combat Crew - The prestation of the latest information to help the Combat Crew to successful carry out their mission and back. Usual presentated two hours before take off. Very informal affair and will vary from group to group etc. The Commanding officer Intelligence and Operation officer personalties, facilities and equip depends on that (Briefing) Responsibility remains with the intelligence dept. (S-2) Operations is Concerned with the time it occurs, take off etc. Symmetric their watches. Revendrome with fighter escort, time place of crossing enemy lines = operations

The altitude of flying to target etc. Methods of destroying equip in case of failure etc. Watch out for our own balloon barrages, artillery positions and practice bombing range. Also location of recuse aids. Weather office - all about weather conditions all the way. The ordance officer - ammo & bombs etc will tell at the briefing. Signal Officer or Communication officer established procedures, codes, regnaticum signals etc to be used. The location of light, beacons etc also. and in enemy terrain comes under G-2. Engineering officer - about special and tech equip. S-2 Officer would tell all informs., maps, photo, aerial mosaics etc. overlays. Aeronautical maps etc. Photos of anti aircraft installations, decoy targets etc. air fields and cities or changing of shore lines by camoplaghouse. Models pictures sketching etc of air planes. Target itself will be given all inform in detail, with photos, maps etc.

Interrogation ??? (Interview)

Undertaken by one individual - must function dyplomatically rapidly etc in order to give the crew rest etc. Interview by crews or groups. S-2 Officer before crew comes back must know what he wants to find out on their return. Preliminary report given out right away about success of mission, planes losted or returned etc. Informal affair. Three things the G-2 wants to know in connection with each observation (1) time (2) place (3) Altitude also estimate no of enemy planes knocked down by our planes. Type of questions that may be asked (1) If primary target was attack and estimate of the damage and if not why and so on. (2) time & altitude (3) number of runs (4) method of approach

(5) And estimate of effects of bombing. (6) The Anti aircraft over the target and search lights (7) about fires burning in the area of the targets before raid and after. (8) The route that was followed and if any attenuation and why. About land marks (9) About wheater conditions (10) Photo taken on raid would be used in interview (11) About enemy planes, where, how etc of method of attack and type of planes. (12) About Barrage Balloons, beacons etc. (13) About smoke screens in the area etc. (14) Passing over air fields activities, changes etc. also decoy ies (15) Activity observed on land, coastal area, harbor etc. (16) Failure of equipment is noted - technical equip with in itself.

Evaluation of Information

(1) - Is it Creditable (Is it possible, Can we believe it)
(2) " " Pertinent (3) Is it useful

Method of capability - capability of the enemy ie has so many ships can do this or that so we won't be caught unaware (Possibilities of the enemy)

Flash report - is a hot report of immediate action

Intelligence Estimate of the situation - is usually made up by S-2 when needed and Co can asked for it i.e for u attack etc.

Decimalization - Put into a periodic report, handled imediately or send out at once Can be done by G-2 Documents and reports, periodic reports. G-2 Summaries and special reports - transmittal, Radio, oral and written reports Periodic reports is a document for discriminating

intelligence accumulation during a given time interval.
Intelligence summary is a brief report summarizing the enemies situation known at the moment of reporting. Special Intelligence Reports and studies — with maps, photos, charts etc - Study of a particular situation.

Work Sheet 1-8 heading it is a convient memo pad by subject matter - to help make out Periodic Report - 1-8 head.

Periodic Report or Work Sheets headings*
The headings: Enemy Activities* (Air) (2) (Ground) (3) (Naval) (4) Objective folder data (5) Installations (6) Enemy knowledge of our situation (7) Enemy Capabilities (8) Misc.

Aircraft Indentification

W Wings
E Engines
F Fuselage
T Tail
V Undercarriage
R Radiator or Air scope.
Span is tip to tip, chord from leading edge to trailing edge

- Naval Air Craft. -

3 Classification (1) Offensive Air Craft Based on carrier (2) Service Air Craft on B.B. and Cruisers (3) Air Craft based on shore (defensive) Types fighter maximum performance manouability and gunnery. Fight enemy planes. Must be fast and able to be based on carriers. defensive of carriers and offensive. also against enemy ships (BB) to strafe decks and use light bomb loads. Toperado and Bomber (TB) attack enemy ships and installations (Bomber) The dive bomber SBD based ashore or afloat - Scout plane SB - speed range main function partol work defensive weapons S.O. Scout observation based on carriers to scout enemy forces. land types (2) Service type based on BB and cruisers primary missions scouting - Capulate type or lowered over the side Carry light bomb load for offensive Observation Ship also based on B.B. main function to determine enemy guns etc range etc (land or water) (3) Partol Bomber - based on land - Large ship Base function long range scouting and bombing (is a offensive weapon by use bombs (H) load

Medium range then use a heavy bomber and use light bomb load and recon.
Heavy Bomber-event Recon. Work. added fuel tanks with armor and heavy defensive fire power. on the ship
Air transport – functions (1) transport army personnel (2) transport. Civilian and Gov. Officials (3) transport of essential and critical materials (4) Medical supplies etc. (Air lines Tooken over the Air Lines etc)
Use with out arrangements.
Troop Carrier Command → Air Boring Troops and Para troopers. Glider is also included

Function of S-2 In Bombardment

Supply the Commanding officer with necessary inform. concerning enemy order, of battle, flak, defense position on the ground, flash light belts, dummy targets other perentenate material.

Journal

The Intelligence journal is a Chronological record of the actives of the intelligence section. It is kept by the intelligence sections of wings or equivalent task forces, and higher air Commands. In Groups and Squadrons the intelligence journal is normally combined with those of other staff sections into a unit journal.

The intelligence journal is a perennment general record. It Contains briefs of all messages received or sent. Can receive messages by telegrams, phone, teletype and oral. Journal is substantiated by the file. Entries in the journal are not altered but can be sublement by supsequence entries. The Journal is closed daily or at the end of a period or phase. One copy is given to Chief of Staff for Consolidating with other journals. The journal must provide the answers to the questions, what, who, where and when.

Fighter

Fighter Aviation is charistic to engage in offensive air fighting by attacks of air craft in flight two types, day a light plane such as P39. Nite fighter two engine such as P38. The altitude classification high altitude, 30,000 to 50,000 above Medium alt. 10,000 to 30,000 basicly against enemy bombers (interceptors) Qualification, day fighter ① maneuverablity excellent ② Rate of Climb must be high ③ Service Ceiling ④ Fire power heavy enough armor on other ship and to have a long firing range ⑤ Speed in dive and pull out ⑥ Defensive armor protection fuel tanks mainly ⑦ Range interceptor short range, escort type long range, maximum speed place that its attained. Nite Fighters ① Long range ② heavy fire power ③ Defensive armor protection. Employment (Use) primarily a offensive weapon and defensive of important areas. for escort duty it performs. Fighter air craft is designed to protect other air craft in flight. Suited for attack on balloons, motor transport and mechanized forces. (Anti Air Craft Defense (Flak)

(Bombers)

Medium, heavy, range 3,000 mi light. — attack, dive, classification high altitude 35 to 37,000 (heavy) medium 26 to 27,000 low, enough to stay away from their own bomb concussion Low altitude, dive bombing, day Bombers and nite Precing and area bombing, long range, high service ceiling and good altitude performance built for toughness. Heavy defensive fire power. Heavy armor protection for crew. fast speed, has a light bomb load, sarficed for all other things. Nite Bomber. England does most of it. Requirements, large bombing load. Such as the Shot Sterling and the Land caster (about 16,000 lbs bomb load) Sarfice fuel load, less speed, low ceiling, manuvability, Sufficient fire power to hold off nite fighter and just enough Armorer to protect gas and Crew.

+ Medium - B-25-26 twin engines 1700 mile, day light bomber. Hi speed, manuviability, toughness, smaller bomb capicity bomb trains etc.

+ Attack bomber A-20 - A-29 - A31 Purpose low level bombing around low (tree tops) Good performance at low altitude toughness, Short range (1000 miles) Armor protection for crew and tanks

+ Dive Bomber Attack on shipping and small installation Classified as long range artylley, medium weight carrying capacity 2000 lbs, medium range, ability to dive at a low speed, toughness, Armorer for crew and fuel tanks, Manuvability at low altitude, good fire power. Good maximum speed.

Target Classification - Industrial, enemy air domes enemy ground forces, Communication, road roads and utilities. Naval forces

Anti Air Craft (Flak)

(1) Destroy enemy planes (2) to drive them to a higher altitude (3) Build Civilian moral.

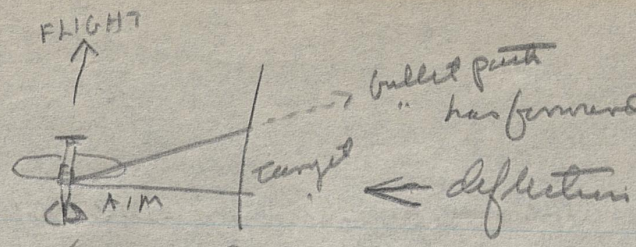
Dection of enemy fighters and Bombers

Radiar system of dection of air craft. (2) Manual devices

Ground Alert - on the line fueled pilot in pits ready to go. (2) Air Alert, planes are revendoro waiting for the enemy comes in (3) Patrol system flies waiting for it to happen

Reconaire + Observation + Transport

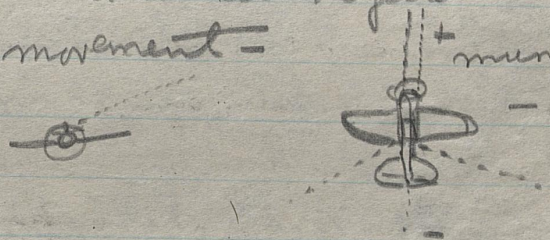
The gaining of informo. thru visual and photo means - Importance of recon. Aviation is most imp. of recon and S2 80% is used from reconis. Avian A Moseca is group of photo fit together to make a large photo of a given area. (F+A) Purpose of Recon Medium + Long range recon. missions. Visual done at low altitudes. Photo is very high or very low. Charctic of recon air craft (Aviation) Carries equip designed for a long or wide angel of vision. Performance Requis. Medium or long range, good performance at hi speed at high or at low altitudes. Sea mission (recon) use heavy sea Patrol Bombers. hi ceiling (service) over the land long range bombers with no bomb load (contin.



axis of the bore is a imaginary line thru the center of the bore

Bullet Pattern - area covered by impacts of rounds which are fired under nearly constant conditions

Forces on a Path of Bullet ---->
Propellent Force - is momentum of bullet which has been derived from the explosion of the cartridge
Rotation - gives stability in flight
Air Resistance - tendance to slow down
Gravity: everything goes up must come down pull of the earth on all objects
Head movement =



Drift - caused by rotation i.e. rotation to the right bullet tends to travel to the right

50% of all shots at 400 yards will fall in a diameter of 12 ft
Imperfections of arms has effect on pattern
Range - is distance from gunners eye to the target
increase in range increase bullet pattern

Exterior ballastics - the action of external forces on a projectal which causes it to travel in a path that varies from the axis of the bore

lateral deviation, is any deviation of a bullet from the axis of the bore in a horizontal plane

Vertical deviation any deviation of a bullet from the axis of the bore in a vertical plane

Projectory is curved path a projectal follows thru space until it strikes something other than air

Defelection - angler amount a gun must lead a target to allow for its travel.

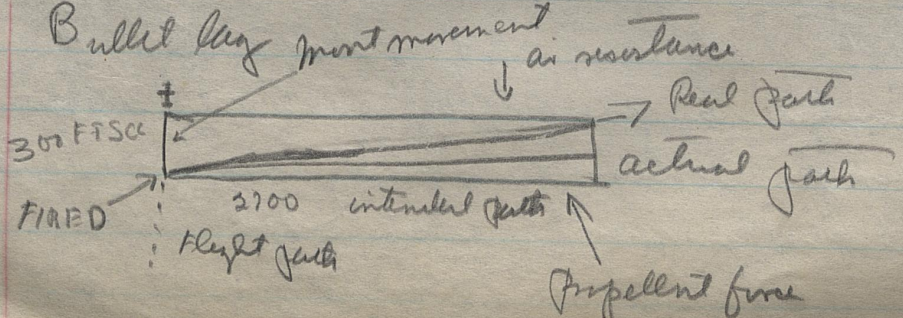
Bullet patterns - forces affecting

Stability of mount, a stable mount smaller pattern

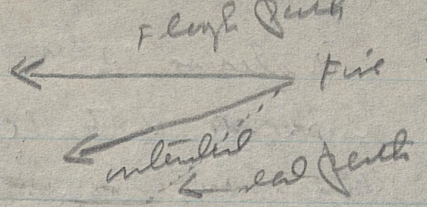
Barrel whip - support of barrel moves

Uniform unity of ammunition, Constanence of air conditions, Range

Bullet lag

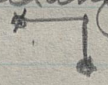


Vertical deflection



Bullet lag is the distance from intended path to the path the bullet really goes caused by the forces acting on the bullet.

Realtive Coordinates. Rectangular and polar
Absolute system coordinates military grid and geo-
geographic coordinates
Rectangular system found by intersecting two lines



Polar coordinates ① Basis ② Direction (Azimuth
③ Distance
Absolute Grid Latitudinal lines E+W
Longitude is N.S. Longitude is measured E.W.
Latitude is measured N.S.

AR 340-15 - Military Correspondence & 340-10

Are subject only, 8½ x 10 paper. margin 1" top 1½ left 3/4
st and 1 inch bottom, each no. When a physical condition
are too great. when written records are required

1 Contact Estimated ceiling 1500 overcast lower broken clouds Visibility 5 miles smoke slightly Bar Press 1021.7 mB temp 40°F Dew P 30°F Wind Northwest 30 mph steady alt 20.16 hg Ceiling Ragged

2 Estimate ceiling 800 ft overcast Visibility 3 mi moderate thunderstorm & rain light light fog Bar press 1012.5 mB temp 53°F Dew pt 51°F Wind West South west 12 mph steady alt 29.89 hg Thunderstorm moderate moving North East occasily Heavy rain

3 traffic untrolled Special Estimated Ceiling 5000 ft hi Broken lower Broken Visibility 6 mi light rain Bar press 1012.2 mb temp 60°F Dew pt 57°F Wind South 18 mph steady alt set 29.88 hg few 12000 ft overcast Raido range not operative Brocasting not operating

4 Contact estimated ceiling 1800 over cast hi lower broken visibility unlimited Bar press 1016.3 mb temp 62°F dew pt 59°F wind South South West steady 13 mph alti 29.86 hg

5 Contact Estimated Ceiling 1200 ft Broken lower Broken visibility unlimited bar press 1016.3 mb temp 72°F Dew p. 60°F Wind west Southwest steady 22 mph alti 30.00 hg

6 Contact Special Estimated ceiling 2500 ft broken lower broken visibility or unlimited 10 mi light rain showers Bar press 1016.3 mb temp 71°F Dew pt 62°F Wind steady South Southwest 13 mph 30.00 hg

7 Contact unlimited Sky Clear
visibility unlimited Bar pres 1015.9 mb
temp 68°F Dew pt. 34°F Wind west 17 mph
Alt. set 29.99 hg steady

8 Contact light overCast hi
Ceiling unlimited 2200 scattered Clouds
Visibility unlimited (10 mi) Bar pres 1018.5 MB
temp 78°F Dew pt 66°F Wind West South west
peak gust
10 mph Alti Set 30.01 hg

9 Big Springs observer Ceiling 1500 Broken
300 ft scattered Clouds 1¼ visibility Moderate
Thunderstorms rain light small hail
Bar pres 1000.2 mb temp 72°F Dew pt 41°F
Wind North west 12 mph peak gust. Alti 29.52 hg

10 Closed Ceiling 200 overCast
visibility ½ mile Heavy freezing drizzle
thick fog Bar pres 1029.9 mb temp 30°F
Dew pt 30°F West 3 mph alti set 30.50 hg
Pilot reports top of overcast 18 thousand ft
Mean sea level

AIR INTELLIGENCE PLAN

4 Bomb Comd. — UNIT

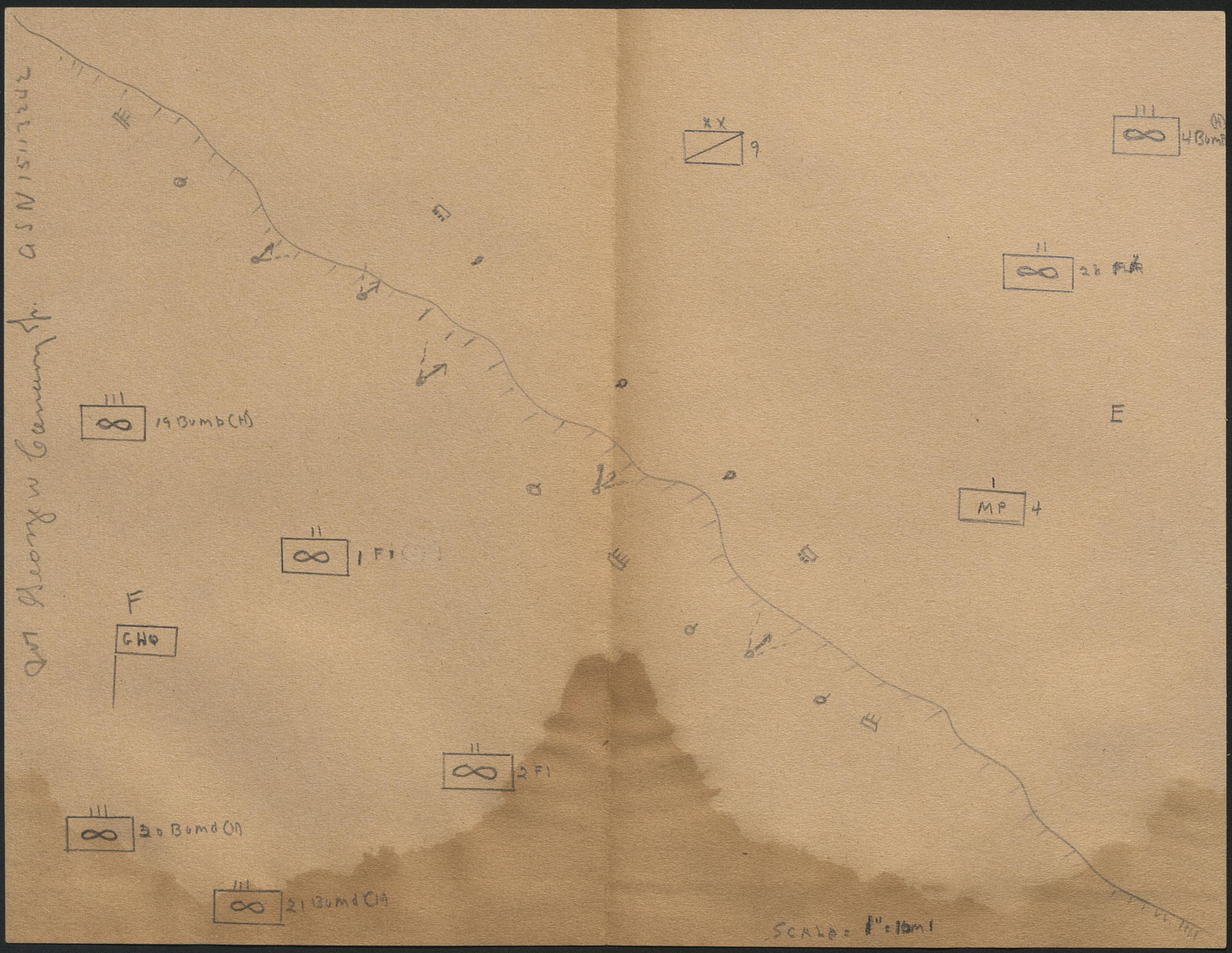
42nd & Broadway — LOCATION

2nd Tuesday 6th Week — DATE

TIME

Phases or Periods of the Operation	Esential Elements of Information	Indications (Analysis of E. F.)	Collecting Agency or Source	Specific Orders or Requests	Time and Method of Reporting Remarks
12-7-41	With the Japs Attempt to Invade the west Coast by Sea, when where, how	Bases of Supply Near to Coast (STRIKING-DIST) the location, desption of Naval Forces, area around Hawaii	Pacific Naval Protect Sqd. performing recon in that area	Pacific Portol information of size, type, of Jap Naval Forces open in said area	By Naval radio & By our recon Planes & phone from other Sqds

45342



XX
9
4 Bumb (H)
2 FLAK
E
MP
4
19 Bumb (H)
1 Fl
F
GHQ
2 Fl
20 Bumd (H)
21 Bumd (H)
SCALE = 1" = 10 ml

- 28 miles -

87°

76° - 36 mi

100° - 8 mi

[Pages 13 to 24]

.50 CALIBER
QUARTERS STUDY ASSIGNMENT

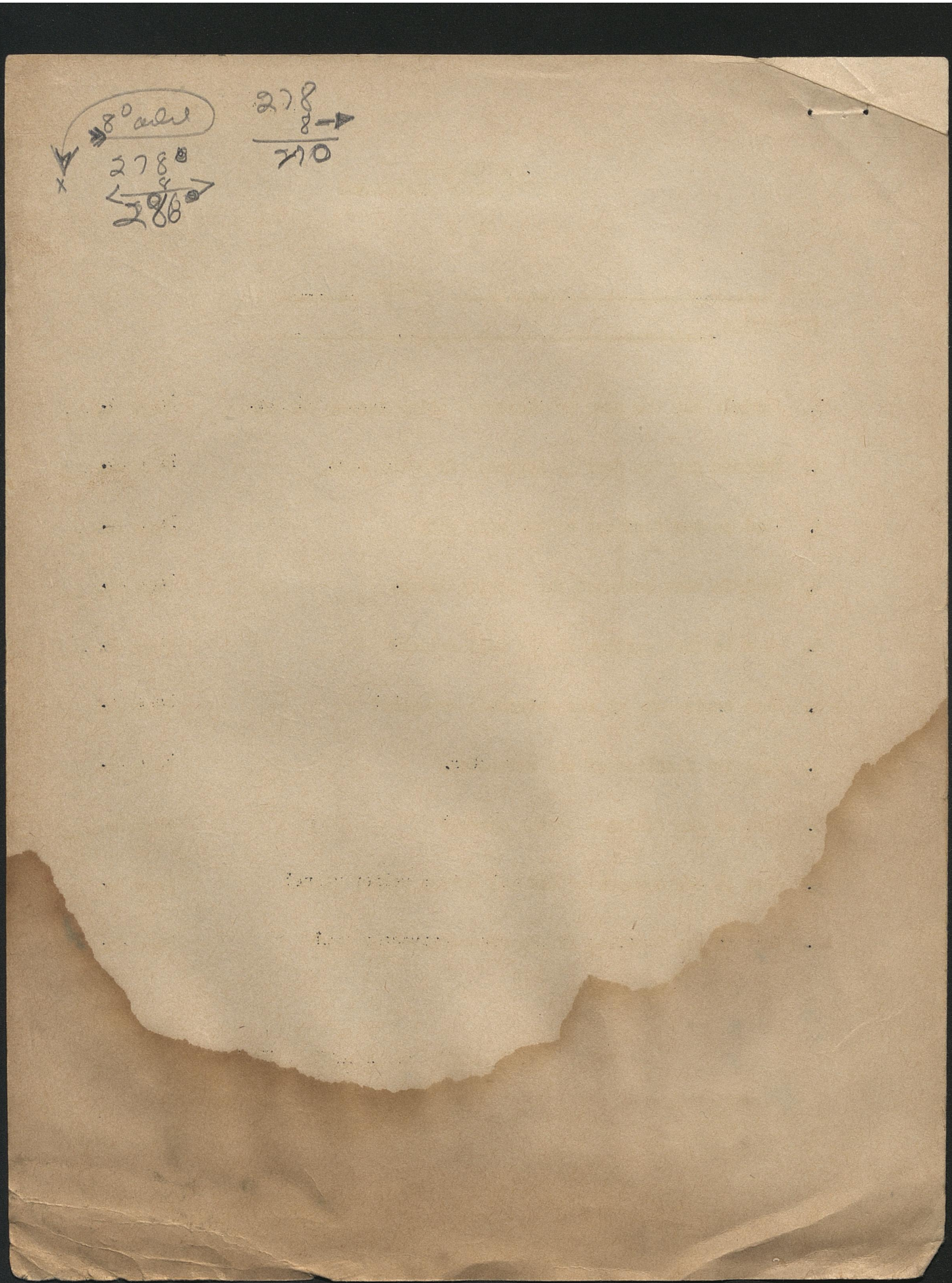
NO. 2

NAME George W Canary Jr. SECTION 18

INSTRUCTOR Sgt Conity

1. Explain how the sear is depressed using manual trigger. Page No. 13
2. Explain how the sear is actuated from the side. Page No. 14
3. What is the function of the sear stop PIN? Page No. 14
4. Explain what actuates the cocking lever. Page No. 14
5. What is the function of the bolt switch? Page No. 15
6. What parts make up the extractor assembly? Page No. 15
7. Give the function of the extractor. Page No. 15
8. What is the function of the barrel? Page No. 16
9. What is the purpose of the oil buffer relief valve? Page No. 19
10. What is the function of the cover extractor cam? Page No. 21

NOTE: WRITE ANSWERS ON ATTACHED SHEETS


8° add
278°
288
278
8
270

(1) The sear which moves vertically in the back end of the bolt, may be depressed by pushing down on the small protrusion which extends up beyond the top of the bolt. When manual trigger is supplied, the sear is depressed in this manner by means of the trigger bar at the top of the receiver. Downward movement of sear releases firing pin extension

(2) The sear may also be actuated by side pressure on the end of the sear slide. The necessary pressure may be supplied by electrical (solenoid) means or by a cable attachment which fastens to the side plate.

(3) The sear stop pin projects downward through the body of the bolt to act as a stop for the firing pin spring

(4) The cocking lever, which at its lower end engages with a slot in the firing pin extension, has its top end projecting above the bolt. This top end engages with a cam in the top plate bracket of the receiver to cock the firing pin.

(5) The bolt switch fits into the circular depression in the top of the bolt and may be assembled to make one or the other of these two ways. Continuous, the selection depending on whether ammunition will be fed from the right or left side

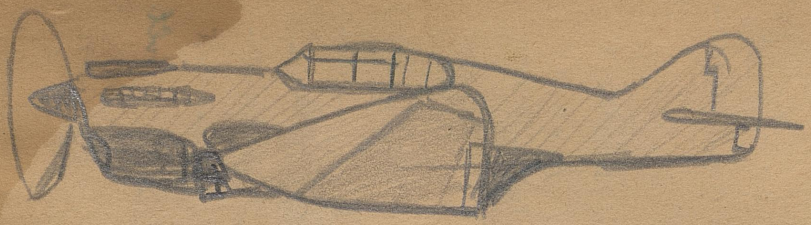
(6) Ejector Pin, ejector, ejector spring, extractor

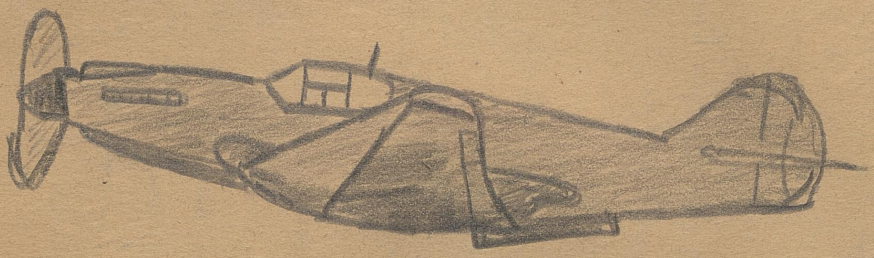
(7) The extractor which fits into a circular hole on the left hand side of the bolt, withdraws a cartridge from the belt and places it in the T slot at the front end of the bolt. The extractor stop pin stops the extractor in its downward swing in the center recoil stroke

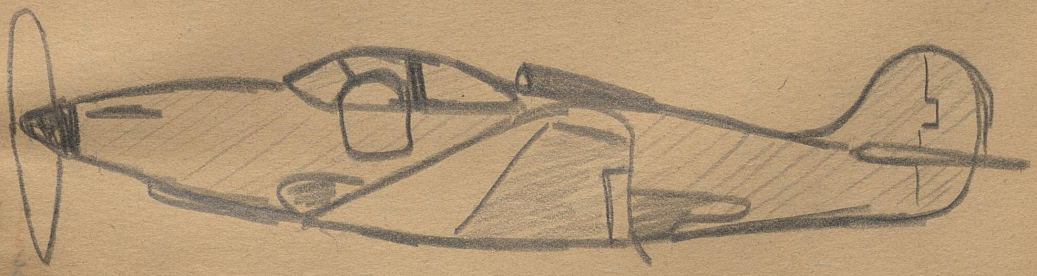
(8) The function of the barrel is to direct the discharged projectile. Its rifling or grooving causes the projectile to rotate and maintain direction and prevent tumbling.

(9) The oil buffer serves to absorb and partially store the recoil energy of the barrel and barrel extension during the recoil stroke. This stored up energy is given up by the oil buffer spring to drive the barrel extension and barrel forward.

(10) This cam forces the extractor and new cartridge downward and new cartridge downward as the bolt travels forward to rear. The cover extractor spring which is also assembled to the underside of the cover limits the upward movement of the extractor during the final forward motion of the bolt



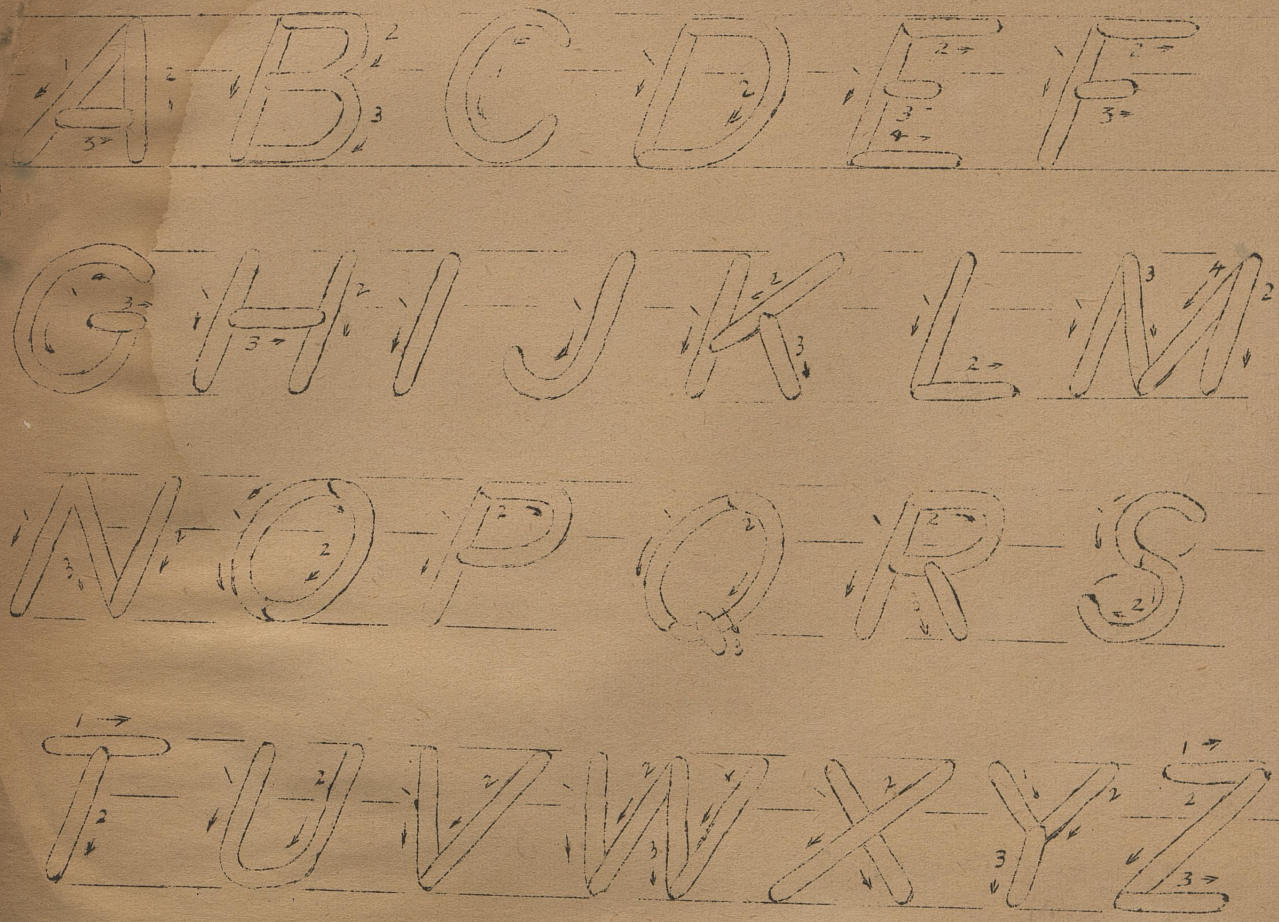








F-4. STROKE TECHNIQUE CAPITAL SLANT LETTERS

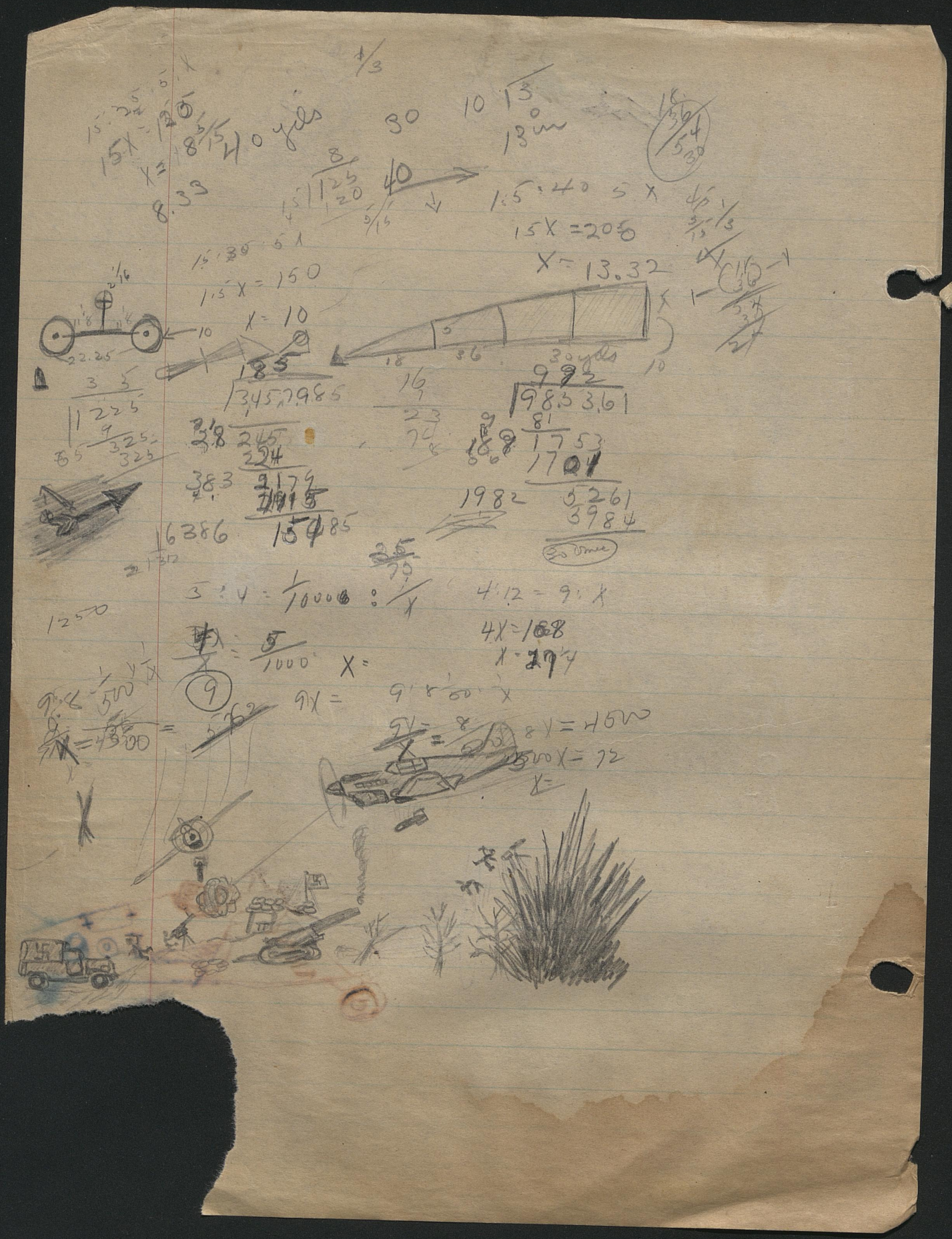




ZN C ⊗ +⦶/6V H ⌀40/55/51 ↓3 /994

RQ X 0 1/5 L- F+ 143/29°/29/ →8 /996
F ⊘ X SPL 0155C E20 ⊕ 6⦶ ½V BD+ 998
30/21 ↓39+/990
ZN N SPL 16:24 C E30 ⊕ 15⦶ 2V TRW--BD
152/68/60 ⇗ 22+/996
EO X 70 ⊕/⊕ ½ BN+ 109/92/70 ↘23+/992
TORNODO
KC C ⦶/5 K- 173/69/64 →3/004
JZ 1⊕ ½ F 146/59/59 ↖7 005
~~OP O ⦶/~~
AV C ⊗ O 115/53/42 ← 6/007
DSNT LTING ESE
AQ C SPL 0145C 18⊕⦶ O T 152/57/57
C /006 OVC T26 BRK BKS EWV THSD DSNT W
LTNG OCNLY TO GRND NW TO S TO E





2 Incl
Incl 1 - Photo
Incl 2 - Map (in dup)

HEADQUARTERS SCOTT FIELD
Office of the Commanding Officer

Belleville, Ill.
May 7, 1943.

IN REPLY
refer to:
201

SUBJECT: Annual Invetory of Property.

TO: Commanding Officer, Ninth Fichter Squadron (F), Army Air Forces, Blank Field, Kansas.

1. Attention is directed to the provisions of Paragraph 2, AR 36-6520, April 4, 1937, which require that a complete inventory ----

By order of Colonel Jones:

JOHN B. SMITH,
Captain, Air Corps,
Adjutant.

F VIII

G-2 JOURNAL _____ Date Hour

From _____ _____
To _____ _____
Place _____ _____

ORGANIZATION

TIME OUT	SERIAL NUMBER	TIME DATED	INCIDENTS, MESSAGES, ORDERS, ETC.	ACTION TAKEN

4 PM

$\left|\frac{16}{50}\right| = \frac{x}{100}$ $\quad 50x = 1600$ $\quad 3290$

$\frac{600}{50} = \frac{x}{100} = 3290$ $\quad \frac{6x}{50}x = 501$

Pages 63-67, 76-78

.50 CALIBER
QUARTERS STUDY ASSIGNMENT

NO. 4

OK

NAME George W Canary Jr. SECTION NO. 18

INSTRUCTOR [illegible]

1. Give 3 points to be observed before flight. Page No. 63
2. Give 3 points to be observed after flight. Page No. 63
3. How long should swabbing of the bore be continued? Page No. 64
4. What cleaning, preserving and lubricating materials are specified by the Ordnance Department? Page No. 67
5. What classification of ammunition is used in the Caliber .50 gun? Page No. 64
6. What is the purpose of the color bands on the sides and ends of the ammunition packing boxes? Page No. 64
7. How should ammunition be stored? Page No. 67
8. Give following description of heavy barreled gun. Page No. 76

   Approximate weight -
   Rate of fire -

9. What is purpose of bolt latch on this gun? Page No. 77 ~~76~~
10. Give following description of water cooled M2 gun. Page No. 78

    Length of barrel -
    Rate of fire -

NOTE: WRITE ANSWERS ON ATTACHED SHEETS

(1) Wipe bore and chamber of gun barrel. [2] See that adjusting screws are screwed in tight against buffer dents in backplate. [3] Test functioning of gun by hand, using dummy cartridge [4] See that right buses are clamped in place (flexible gun only)

(2) [1] Unload gun completely and remove belt from ammunition chest [2] Clean bore and all working parts. If this cannot be done at once, oil carefully to prevent rust. [3] Release firing pin spring.

(3) The swabbing should be repeated at each cleaning until a clean flannel patch picks up no foreign matter.

(4) [1] Lubricants - oil - lubricating for aircraft instruments and machine guns. [2] Cleaners - cleaner, rifle bore and solvent, dry cleaning. [3] Rust Preventive Compound, - Compound, rust preventive, light.

(5) [1] Ball - for use against personnel and light targets [2] Armor Piercing - for use against armored vehicles, concrete shelters and similar bullet resisting targets. [3] Tracer - for observation of fire and incendiary purposes. [4] Incendiary - for incendiary purposes Another type provide for special purposes is dummy ammunition for training (Cartridge caseless)

(6) Colored bands painted on the ammunition boxes, and on Carton labels, provide a ready means of identification as to type.

(7) Whenever practicable, small arms Ammunition should be stored under cover. This applies to tracer ammunition which is subject to rapid deterioration if it becomes damp, and may even ignite spontaneously. When necessary to leave [illegible] all arms ammunition should be stored [illegible]

and cover it with a double thickness of gaulin. Suitable trenches should be dug to prevent water flowing under the gun. If practicable, traces ammunition should be stored separately from other ammunition.

(8) Approximate weight 81 lbs. and rate of fire 400 to 500 rounds per minute

(9) The bolt latch is forced downward by the bolt latch spring. As the bolt reaches its rearward position, the bolt latch engages a notch on the upper rear surface of the bolt and holds the bolt to the rear, thus causing the gun to cease firing. The counter recoil stroke is completed by pressing down on the bolt latch release which is pivoted in the back plate. This moves the bolt latch from the bolt notch and allows counter recoil to take place. Providing a cartridge is in the chamber, firing will be resumed when trigger action is released. If bolt latch is held down manually, or if it is locked down by the lock in the buffer tube sleeve the gun will fire automatically.

(10) Length of the barrel is 45 inches and rate of fire is 600 to 750 rounds per minute.

Intelligence Bulletin ✓ Volume No 1 #4 Dec 1942
Japanese Fighter Air Craft ✓
Japanese Light Tanks ✓
German Anti Air Craft Guns ✓
JU 88 ✓
German Military Symbols Jan 1943
German Heavy Artillery ✓
JU 88 ✓
German Camouflage
Bulletin ✓ Volume No 1 #5 Jan 1943
Japanese Land Units ✓
Japanese Anti Air Craft Guns ✓
Japanese Transport Planes ✓
German Anti Air Craft Guns. ✓
German methods of War Fare
German Tanks Tactics ✓
German Camouflage ✓
German Mines (Land) ✓
Tactical + Technical Trends No 23 April 22, 1943
German Anti tank magnetic charge ✓
Russian Camouflage
Ju 88 (German) ✓
German Tactics ✓
~~German~~ Japanese Air Craft Aug 1942
Japanese Bombers ✓
Japanese Fighter Planes ✓

Japanese Torpedo Planes
Japanese Camouflage

German Mines (Land)
German Methods of War Fare

(See German Anti Tank Magnetic Changes – Tactical & Technical Trends NU23 April 22, 1943)

German Anti Tank Magnetic Changes

Tactical & Technical Trends NU23 April 22, 1943

(See German Mines [Land])
(German Methods of War Fare)

German Camaflage
German Method of War Fare
German Military Symbols Jan 1943

Japanese Anti Air Craft Guns
British Volumne Nol #5
Mar 1943

German JU 88 Plane
Intelligence Bulleton No1
#4 Dec 1942
German Military Symbols
Jan 1943
Tactical & Techenal Trends
No23 April 22, 1943

German Anti Air Craft Guns
Intelligence Bulleton No1
#4 Dec 1942
British Volumne No1 #5 Mar 1943

Germany Heavey Artillery
German Military Symbols
Jan 1943

German Tactics
Tactical & Techenal Trends
No23 April 22, 1943

German Tank Tactics
German Method of War Fare

Japanese Fighter planes
Intelligence Bulleton Vol N1 #4
Dec 1942
Japnoese Aimcraft ANG 1942

Japanese Torpedo planes
Japanese Aimcraft ANG 1942

Japanese Bomber planes
Japanese Aimcraft ANG 1942

Japanese Light Tanks
Intelligence Bulleton Vol No 1
#4 Dec 1942

Japanese Transport planes
Bmitian Volume No 1 #5
Mar 1943
Japanese Aimcraft ANG 1942

Japanese Naval Units
Briton Volume-No 1 #5
Mar 1943

SECOND AIR FORCE INTELLIGENCE SCHOOL
EIGHTEENTH REPLACEMENT WING
ARMY AIR BASE, SALT LAKE CITY, UTAH

MEMORANDUM: Filing systems in Intelligence Offices.

1. It is quite likely that some of the intelligence school graduates assigned to newly organized units will participate in the setting up of filing systems in their intelligence sections. It is with this in mind that the following material has been prepared.

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"Succesful filing involves not only the actual operation of placing papers in a file or other receptacle, according to a simple and economical system, until such time as they may be called for, but more especially the production of such specific papers, upon request or call therefor, with the minimum time involved. It is primarily for the latter purpose that files and systems of filing are introduced. Filing may thus now be appropriately called a science and no longer a knack, as it was formerly when papers were theoretically thrown into a "barrel," the then so-called best file, without systematic arrangement, with the only assurance of finding the papers being the fact that they were at one time placed therein.

"The method of numbering and arranging the subjects in this classification is based upon the Dewey Decimal System of Library Classification devised by Mr. Melville Dewey. His system divided the subjects of human knowledge into not more than 10 main classes, represented by the Arabic numerals 0 to 9, both inclusive. These 10 classes were each in turn subdivided into not more than 10 subclasses, and in turn the 100 subclasses thus created were each divided into not more than 10 divisions and so on. The numerals representing the 10 main classes in this volume are expressed in numbers of three digits, as 000, 100, 200, 200, and so on to 900. The first digit to the left represents a main class, the second digit represents a subclass of the main class, and the third digit a division of the subclass. After the subdivision of these numbers as hereinbefore provided has been exhausted, further subdivision of the divisions is effected by affixing additional digits to each number, separated therefrom by a decimal point. Therefore, each digit added to the right of a number represents a subdivision of the subject, represented by all the digits to the left. The general subjects have first been treated, and then the detailed features thereof derived in sequence as subclasses, divisions, and subdivisions. While the underlying principles are based upon the use of Arabic characters, resort to the use of alphabetical filing, within the groups of subjects represented by numerical characters, is had in many instances. This procedure is not a departure from the basic principles of decimal classification. The results produced thereby are twofold, viz, first, it makes a closer subdivision, and second, it gives much more elasticity to the system, which at this time is imperatively necessary, due to the multiplicity of subjects already involved and the addition of many new ones in correspondence handled by the War Department and its adjunct offices.

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"The chief merits of the decimal system of classification lie in the fact that the subject of correspondence determines the exact location; that it is applicable to the most varied subjects; that, by analogy, subjects, provisions for which have not been specifically made, can be associated with correlated subjects for which provisions have been specifically made; that not only are all papers on one subject found together, but those closely allied therewith precede or follow, they in turn being preceded and followed by other allied subjects as far as possible."

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2. Application of the Dewey decimal system as used by the War Department to the filing needs and requirements of an intelligence section is not a difficult task, even though many of the subjects which are of primary importance to intelligence operations are not given any emphasis in the Correspondence File.

3. Care and attention, however, are necessary if the decimal system of the Correspondence File is to be applied to intelligence files. Experience has indicated that the effort is worthwhile.

4. Before beginning to set up or to revise a filing system, it is imperative that the persons concerned study and understand Pars. 1-41 of the War Department Correspondence File, a copy of which should be in the headquarters of every Army Air Force office of record.

5. As an aid to the establishment of a filing system in the intelligence office of a group or squadron the following headings, all taken from the War Department Correspondence File, are suggested. Not all of these headings may be required in any particular office, and it is quite likely there may be headings not listed here which could be used. These represent merely a suggested method of arranging the files of intelligence correspondence and other materials.

000- GENERAL

000.7	Publicity and public press
000.71	Interviews and giving out information.
000.72	Secret and confidential matters
000.73	Censorship
000.91	Camouflage
045	Navy Department
045.92	Naval vessels
045.93	Operations and movements
060	Maps, charts, and tables
061.01	Mapping and map work
061.03	Drawings, tracings, sketches, and blue prints
061.1	Maneuver and war maps, battle field maps
061.2	Confidential maps
061.93	Foreign maps

100- FINANCE AND ACCOUNTING

140	Accounting for property, supplies, stores, etc.
143	Returns of property and supplies
143.5	Memorandum receipts and accounts

200 PERSONNEL
201 Personal records
210 Officers
220 Enlisted men

300 ADMINISTRATION
300.3 Army regulations
300.4 Orders
General orders, War Department
General orders, Army Air Forces
General orders, Second Air Force
Special orders, Group
Special orders, Army Air Base
Field orders
Operations orders
300.5 Circulars and bulletins
Training Circulars, War Department
Air Information Bulletins, War Department
Information Bulletins, MIS, War Department
Counter Intelligence Bulletins, War Department
300.6 Memoranda, notes
Memoranda, Army Air Forces
Memoranda, Second Air Force
Memoranda, _____ Wing
Memoranda, _____ Group
Memoranda, _____ Air Base
Operations memoranda
(also make provision for unnumbered memoranda of above organizations.)
300.9 Miscellaneous regulations
Army Air Force regulations
Army Air Base regulations
311 Communications, method of
311.23 "Incoming" radiograms
311.23 "Outgoing" radiograms
311.5 Secret and confidential communication, methods of
311.7 Censorship
312 Correspondence
319.1 Reports
319.2 Miscellaneous administrative matters, S-2
320 Organization of the army
333.5 Investigations
336 Foreign and international affairs and relations
336.2 Foreign armies
336.3 Foreign navies
336.8 Activities of foreigners in United States
350 Education
350.001 Lectures
350.05 Military information, collection
350.06 Military problems
350.07 Military observations
352 Army Service Schools
353 Training
353.01 Schedules
353.5 Drills and exercises
353.9 Miscellaneous

354.2 Manuevers
370 Employment, operation, and movement of troops
373 Aerial operations, all sorts
383.5 Spies, espionage

400 SUPPLIES, SERVICES AND EQUIPMENT
400.311 Methods of preparing and submitting requisitions
400.312 Requisitions for supplies, repairs, and alterations, etc.
452.9 Means of identification of aircraft
461 Publications, books, periodicals
467 Camouflage supplies and equipment

500 TRANSPORTATION

600 BUILDINGS AND GROUNDS
660 Fortifications
660.1 Foreign
660.2 Land defense and coast defense works
681 Depots
686 Aviation fields, landing places, stations

700 MEDICINE, HYGIENE, AND SANITATION

800 RIVERS AND HARBORS

RESTRICTED

SECOND AIR FORCE INTELLIGENCE SCHOOL
EIGHTEENTH REPLACEMENT WING
ARMY AIR BASE, SALT LAKE CITY, UTAH

MEMORANDUM: Files and records.

Proper utilization of the materials received in an Intelligence Office of a tactical organization is possible only if there are adequate records showing what has been received and where each item of information can be found.

The following materials may assist in the task of setting up files and records in a newly organized intelligence unit. There are several methods which might be followed, and this is merely a suggested system.

Required are:

1. A record of publications and training materials by series, such as Field Manuals, Informational Intelligence Summaries, etc.
2. A subject index of information pertaining to intelligence operations and activities.
3. A system of filing materials which will make it a simple process to locate anything listed in the indexes.

****

I. AN INDEX LISTING PUBLICATIONS, ETC. BY SERIES.

This record should be kept in a loose-leaf notebook with a separate sheet for each type of publication, or at least sufficient room under each heading to permit the addition of new listings as they become necessary. Each bulletin, pamphlet, etc. in each series should be listed on the page by number, title and date.

An Intelligence Office does not keep complete files of such materials as Army Regulations, War Department Circulars, etc., but it should have files of such of these publications as relate to intelligence operations. Those regulations, memoranda and bulletins actually kept in the files of an intelligence section of a group or squadron should be listed in the index by number, title and date, the same as other publications.

The following list includes most of the types of publications which might be included in this index of intelligence materials.

PUBLICATIONS INDEX
(MIS-military intelligence service, U. S. Army)

Aircraft Intelligence Reports
Aircraft Silhouettes
Air Force General Information Bulletins
Air Forces News Letter
Air Information Bulletins, MIS

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Anti Submarine Bulletins
Bulletins, War Department
Circulars, Air Corps
Circulars, War Department
Campaign Studies, War Department
Commanding Officers Official Bulletin
Counter intelligence Bulletins, MIS
Digests and lessons of Recent Military Operations
Evaluation Reports
Field Manuals
General Orders, War Department
General Orders, Army Air Forces
General Orders, Second Air Force
General Orders, Army Air Base
Identification Wheels
Information Bulletins, U. S. Fleet
Information Bulletins, Office of Chief of Naval Operations
Information Bulletins, MIS
Informational Intelligence Summaries, (regular)
Informational Intelligence Summaries, (special)
Intelligence Bulletins, MIS
Memoranda, Army Air Forces
Memoranda, Second Air Force
Memoranda, _____ Command
Memoranda, _____ Group
Memoranda, Army Air Base,
Memoranda, War Department
Miscellaneous Non-serial Publications
Objective Folders
Office of Naval Intelligence Publications
Operational Intelligence Publications
    Airport Directories
    Air Movements Publications Manual
    Air Route Guides
    Air Route Manuals
Posters
Regulations, Army Air Force
Regulations, Army
Regulations, Army Air Base
Signal Publications
Special Orders, Army Air Base
Special Orders, _____ Group
Special Series, MIS
Tactical and Technical Trends, MIS
Technical Manuals, War Department
Training Circulars, Second Air Force
Training Circulars, War Department

II. SUBJECT INDEX

Intelligence publications have value in proportion to the timeliness and usability of their contents. It is important, therefore, that an Intelligence Officer or other intelligence personnel be able to determine quickly what materials are available in the office on the capabilities of Japanese aircraft, camouflage, German uniforms, or any other of dozens of subjects of importance in intelligence operations. Such ready reference to the proper sources is made possible by a subject index.

Establishing such an index in an office already in operation is a relatively laborious process, but thoroughly worthwhile in the long run. A new organization will find it to advantage to set up such an index from the start.

As each new publication is received, entry should be made on the proper page of the Publications Index and then other entries made in the Subject Index under all headings to which the contents of the publication are applicable.

If cards 3 x 5 inches in size are available they can be utilized for the basic entries in the subject index. A loose-leaf note-book can be used instead of cards.

SUBJECT INDEX

Aerial photography
Air Borne troops
Aircraft
  Characteristics
  Identification systems
  Identification of
    (data by countries, classified by types of aircraft)
Airports and landing fields
Air Routes
Anti-aircraft defenses
Anti-submarine warfare
Anti-tank operations
Armored forces
  (data by countries)
Australia, misc.
Axis Nations, misc.
Booby traps
Camouflage
Campaigns
  (list by theaters of operation)
Charts
China, misc.
Commandos
Communications
  Air-ground
  Codes and ciphers
  Equipment
  Ground
  Radio intelligence
Correspondence
Counter intelligence
Damage assessment
Equipment
Geography
Germany, misc.
Gliders
Great Britain, misc.
Ground forces
  Chemical warfare
  Coast Artillery
  Engineers
  Field Artillery
  Infantry
  Ordnance
  Signal Corps
Incendiaries
Intelligence Procedures
  Briefing
  Collection agencies

Intelligence Procedures (cont.)
- Collection of information
- Dissemination
- Estimate of the Situation
- Forms
- Intelligence Annexes
- Intelligence Plan
- Interrogation
- Orders
- Preparation of reports
- Situation maps
- Work Sheet

Italy, misc.
Japan, misc.
Maps
Material, examination and disposition of captured
Military organization (data by countries)
Morale
Naval tactics
Naval vessels, identification of (data by countries)
Navies (data by countries
Objectives (classified by type)
Objective folders (arranged alphabetically by geographic areas)
Operations and tactics (aerial)
- Attack techniques
- Bombardment
- Defense techniques
- Decoy tactics
- Escort tactics
- Interceptor tactics
- Night operations
- Patrolling
- Close support tactics

Operations and tactics (other than aerial)
- Armored force
- Ground troops
- Desert
- Joint army-navy
- Jungle
- Landing
- Winter

Paratroops
Prisoners, examination and disposition
Public relations
Recognition systems
Russia, misc.
Sabotage
Secrecy discipline
Subversive activities
Supply
Tactics (see operations)
Theatre of operation
Training
Uniforms (data by countries)
United Nations, misc.
United States, misc.
Weather

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III. A FILING SYSTEM

Proper filing will make it simple to locate any materials received at an intelligence office.

The War Department uses the Dewey decimal system as the basis for the filing of correspondence, and this system can be adapted to use in an intelligence office. The attached memorandum on filing systems lists those headings of the decimal filing system which appear to have most application to an intelligence office. Additional headings can be obtained, if needed, from the War Department Correspondence File.

Whether or not the Dewey decimal system is utilized in an Intelligence Office, it may prove convenient to bind certain series of publications together in a notebook. All Informational Intelligence Summaries might be handled in this way, as also might War Department Training Circulars, Second Air Force Memoranda, incoming and outgoing radiograms, and a number of other types of materials.

The important thing is to keep the filing system simple and understandable. A filing system devised by a particular individual might be satisfactory for his use but be absolutely meaningless to anyone else. The filing system of an intelligence section should be such that, if necessary, any member of the section could quickly find anything in the files and such that new personnel can accustom themselves very rapidly to the system.

Proper attention must be given at all times to the classification which a particular document bears. Confidential and secret documents must be handled in conformity with regulations governing such classifications and filed in the safe. Secret documents must not be referred to by a title which will disclose their contents. For records keeping purposes it may be wise to keep within the safe a reference list of the materials which the safe contains.

SECOND AIR FORCE INTELLIGENCE SCHOOL
EIGHTEENTH REPLACEMENT WING
ARMY AIR BASE, SALT LAKE CITY, UTAH

MAPS AND CHARTS

Proper utilization of the best available maps is essential to successful intelligence operations just as it is to successful bombing missions.

No intelligence section can handle its map supply without a filing and storage system which will show exactly what maps and charts are available and enable any desired chart to be located at once.

The type of storage cabinet used will depend on what is available, but it should not be anticipated that a regular map cabinet will be at hand in the field. Whether maps are filed flat, rolled, or folded may depend on the type off storage facilities available.

In the indexing of maps and charts the most convenient system ordinarily will be alphabetical by geographic areas. Where a numerical key is used on the sheets, as in the case of U.S. regional aeronautical charts, this will provide the basis for filing.

In a theater of operations, where reference to maps may be by code symbol rather than by name, the file index should be altered to fit the code references.

Personnel having any-thing to do with map filing should familiarize themselves with the Catalog, Aeronautical Charts and Related Publications issued by the Map-Chart Division, Technical Service Photograph, Hq, AAF, Washington, D.C., in May, 1942. This catalog shows what charts are available and outlines a requisitioning procedure.

A suggested method of filing and indexing maps and charts in a group or squadron follows:

1. Pilotage Charts:
   a. U.S. Sectional Aeronautical Charts, scale 1/500,000.
      -file alphabetically by title.
   b. U.S. Regional Aeronautical Charts, scale 1/1,000,000.
      -file by reference number, 1M through 17M.
   c. U.S. Radio Direction Finding Charts, scale 1/2,000,000.
      -file by reference number, 21DF through 26 DF.
   d. Other aeronautical charts (European, African, Alaskan, Netherlands, Indies, etc., depending on theater in which the group or squadron is operating).
      -file alphabetically by title.
2. Special maps and charts:
   a. Strategic maps, Corps of Engineers, U.S.Army, scale 1/500,000.
      -file alphabetically by title.
   b. Hydrographic Office Planning Charts, Long Range Navigation Charts and Approach Charts, scale varied.
      -cross file alphabetically by title or description of area and by reference number printed on the chart.
   c. Coast and Geodetic Survey Charts, scale varied.
      -cross file alphabetically by title or description of area and by reference number printed on the chart.

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3. Target Charts:
   a. These charts may include aerial photographs, mosiacs, large or medium scale charts, sketches or other map substitutes. They are designed to meet air force requirements in carrying out day or night bombing missions.
      -file alphabetically by major geographic area. The size or types or area will be determined by the number of such target charts which are available and the type of missions assigned the organization.
      -cross reference in the map and chart index should be made to target charts contained in objective folders.

It is recommended that the index sheets be as follows:

Reference	Title and Contents of Chart	Scale	Number on hand

(Data in the "reference" column will be the key number printed on the chart, as 21DF, HO 1500, etc. Data in the "number on hand" column will make possible a current check on the number of each type of map or chart available for use.)

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